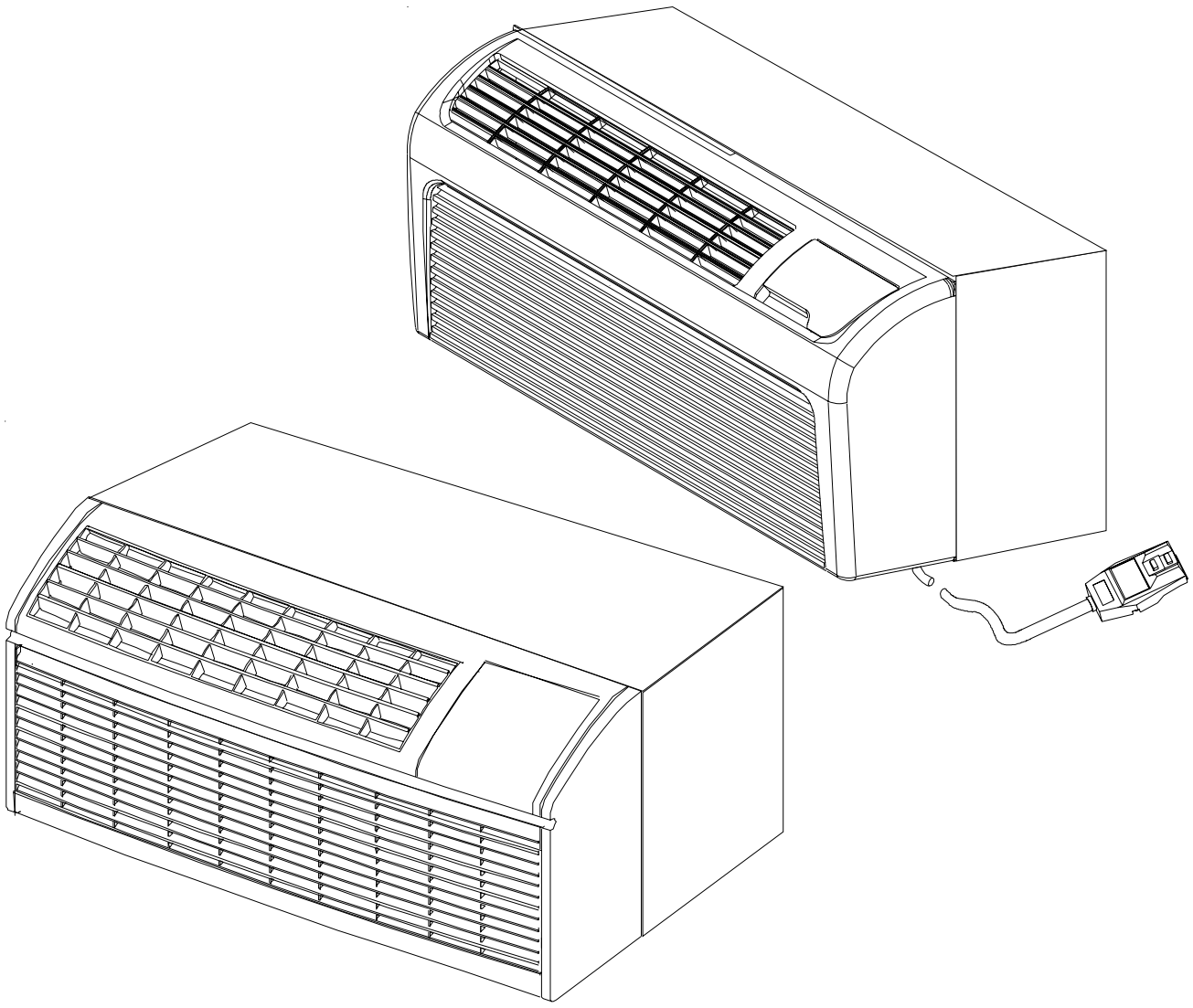
Service Instructions

PACKAGE TERMINAL AIR CONDITIONERS & HEAT PUMPS



This manual is to be used by qualified HVAC technicians only. Goodman does not assume any responsibility for property damage or personal injury for improper service procedures done by an unqualified person.

RS4200003 Rev. 1
October 2005

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⚠ WARNING

THIS AIR CONDITIONER IS NOT MEANT TO PROVIDE UNATTENDED COOLING OR LIFE SUPPORT FOR PERSONS OR ANIMALS WHO ARE UNABLE TO REACT TO THE FAILURE OF THIS PRODUCT.

THE FAILURE OF AN UNATTENDED AIR CONDITIONER MAY RESULT IN EXTREME HEAT IN THE CONDITIONED SPACE CAUSING OVERHEATING OR DEATH OF PERSONS OR ANIMALS.

PRECAUTIONS MUST BE TAKEN TO WARN OF OR GUARD AGAINST SUCH AN OCCURENCE.

⚠ WARNING

TO PREVENT PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK, UNPLUG THE UNIT AT THE WALL OUTLET OR TURN OFF POWER AT THE FUSE BOX OR CIRCUIT BREAKER BEFORE SERVICING THE UNIT. LINE VOLTAGE WILL BE PRESENT AT THE CONTROL BOARD, TERMINALS L1 AND L2, WHENEVER POWER IS APPLIED TO THE UNIT REGARDLESS OF THE MASTER SWITCH POSITION.

IMPORTANT INFORMATION

Pride and workmanship go into every product to provide our customers with quality products. It is possible, however, that during its lifetime a product may require service. Products should be serviced only by a qualified service technician who is familiar with the safety procedures required in the repair and who is equipped with the proper tools, parts, testing instruments and the appropriate service manual. **REVIEW ALL SERVICE INFORMATION IN THE APPROPRIATE SERVICE MANUAL BEFORE BEGINNING REPAIRS.**

IMPORTANT NOTICES

WARNING

IF REPAIRS ARE ATTEMPTED BY UNQUALIFIED PERSONS, DANGEROUS CONDITIONS (SUCH AS EXPOSURE TO ELECTRICAL SHOCK) MAY RESULT. THIS MAY CAUSE SERIOUS INJURY OR DEATH.

CAUTION

GOODMAN WILL NOT ASSUME RESPONSIBILITY FOR ANY INJURY OR PROPERTY DAMAGE ARISING FROM IMPROPER SERVICE OR SERVICE PROCEDURES. IF YOU PERFORM SERVICE ON YOUR OWN PRODUCT, YOU ASSUME RESPONSIBILITY FOR ANY PERSONAL INJURY OR PROPERTY DAMAGE WHICH MAY RESULT.

To locate an authorized servicer, please consult your telephone book or the dealer from whom you purchased this product. For further assistance, please contact:

CONSUMER INFORMATION LINE
GOODMAN COMPANY, L.P. TOLL FREE
1-877-254-4729 (U.S. only)
email us at: customerservice@goodmanmfg.com
fax us at: (731) 856-1821
(Not a technical assistance line for dealers.)

Outside the U.S., call 1-713-861-2500.
(Not a technical assistance line for dealers.)
Your telephone company will bill you for the call.

RECOGNIZE SAFETY SYMBOLS, WORDS AND LABELS

DANGER

DANGER - Immediate hazards which **WILL** result in severe personal injury or death.

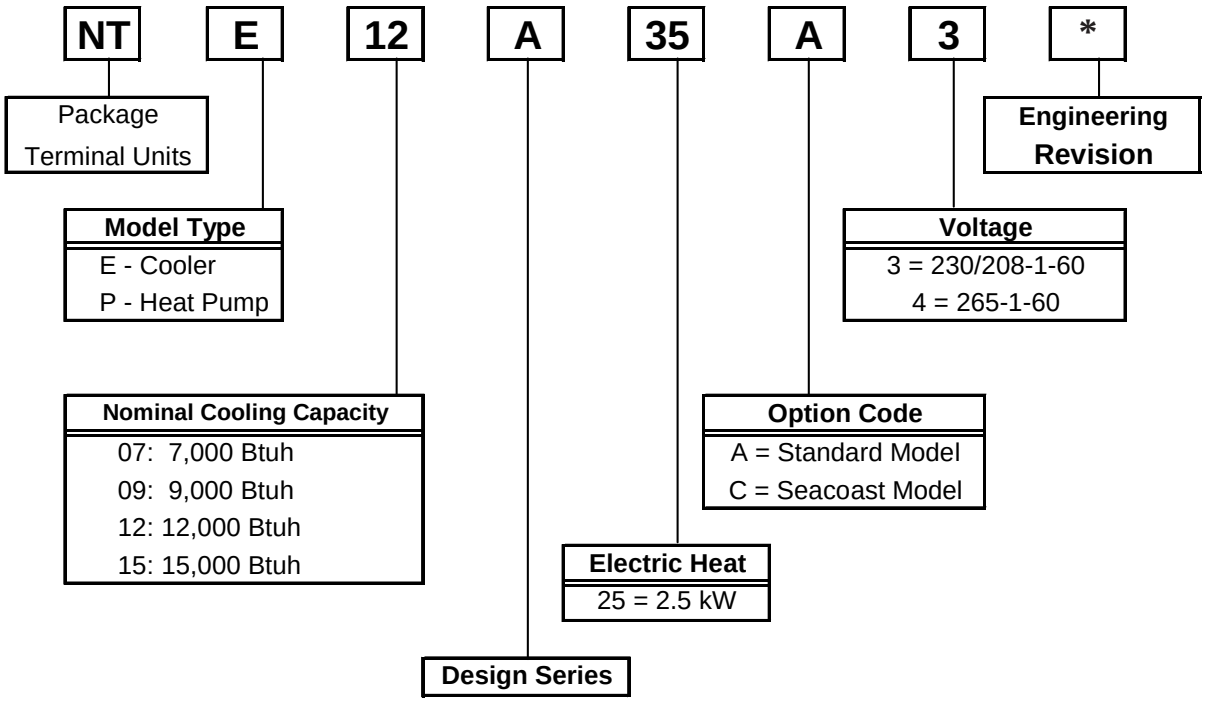
WARNING

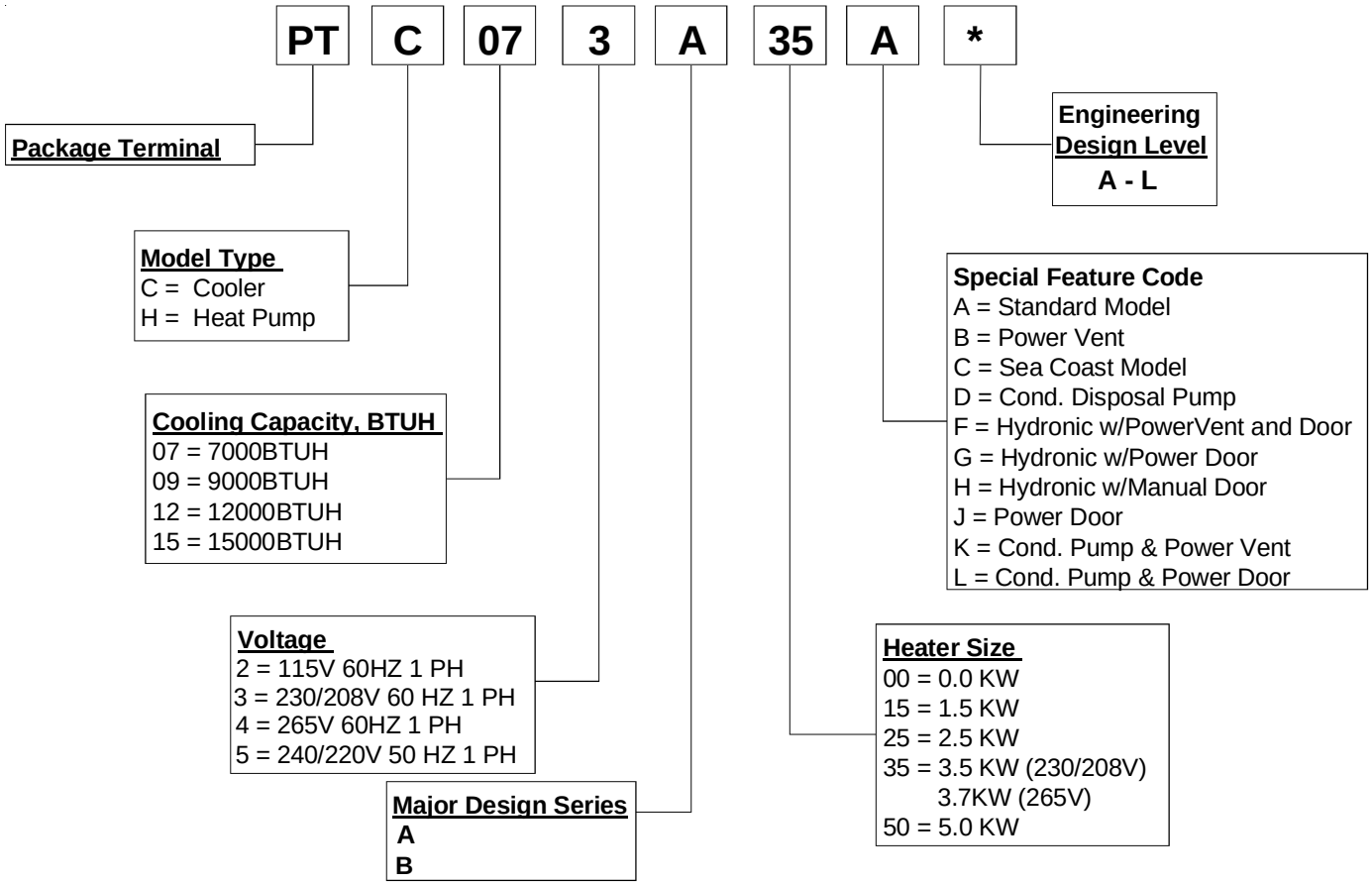
WARNING - Hazards or unsafe practices which **COULD** result in severe personal injury or death.

CAUTION

CAUTION - Hazards or unsafe practices which **COULD** result in minor personal injury or product or property damage.

PRODUCT IDENTIFICATION





SPECIFICATIONS

COOLING DATA (COOLING with ELECTRIC HEAT)								
	PTC073AAA**	**PTC074A**AA**	**PTC093A**AA**	**PTC094A**AA**	**PTC123A**AA**	**PTC124A**AA**	**PTC153A**AA**	**PTC154A**AA**
Voltage[1&3]	230/208	265	230/208	265	230/208	265	230/208	265
Capacity (BUTH)	7,500/7,400	7,500	9,000/8,800	9,000	12,200/12,000	12,200	14,200/14,000	14,200
Amps	2.5/2.6	2.0	3.5/3.8	3.0	4.6/5.0	3.7	7.4/7.9	6.5
Watts	625/610	625	810/790	810	1,145/1,125	1,145	1,510/1,490	1,510
EER	11.6	11.6	11.1	11.1	10.8	10.8	9.4	9.4
UNIT WITHOUT ELECTRIC HEATER Minimum Circuit Ampacity[2&4]	4.0	3.3	4.8	4.1	7.3	5.7	8.4	7.7
CFM	**Cool, Wet Coil**							
HIGH	220/215	220	220/215	220	290/270	290	325/315	325
LOW	175/155	175	175/155	175	220/190	220	250/220	250
	Dry Coil							
HIGH	235/230	235	235/230	235	310/290	310	345/335	345
LOW	185/165	185	185/165	185	235/205	235	265/235	265
	Ventilated Air							
	35	35	35	35	45	45	50	50
Dehumidification (pints/hr)	1.9	1.9	2.7	2.7	3.8	3.8	4.4	4.4
Net Weight	110	110	120	120	130	130	140	140
Shipping Weight (approx. lbs.)	130	130	140	140	150	150	160	160

COOLING DATA (HEAT PUMP)								
	PTH073AAA**	**PTH074A**AA**	**PTH093A**AA**	**PTH094A**AA**	**PTH123A**AA**	**PTH124A**AA**	**PTH153A**AA**	**PTH154A**AA**
Voltage[1&3]	230/208	265	230/208	265	230/208	265	230/208	265
Capacity (BUTH)	7,400/7,200	7,400	9,000/8,800	9,000	12,000/11,600	12,000	14,000/13,800	14,000
Amps	2.5/2.6	2.0	3.5/3.8	3.0	4.6/5.0	3.7	7.4/7.9	6.5
Watts	625/610	625	810/790	810	1,145/1,125	1,145	1,490/1,470	1490
EER	11.5	11.5	11.1	11.1	10.6	10.6	9.4	9.4
UNIT WITHOUT ELECTRIC HEATER Minimum Circuit Ampacity[2&4]	4.0	3.3	4.8	4.1	7.3	5.7	8.4	7.7
CFM	**Cool, Wet Coil**							
HIGH	220/215	220	220/215	220	290/270	290	325/315	325
LOW	175/155	175	175/155	175	220/190	220	250/220	250
	Dry Coil							
HIGH	235/230	235	235/230	235	310/290	310	345/335	345
LOW	185/165	185	185/165	185	235/205	235	265/235	265
	Ventilated Air							
	35	35	35	35	45	45	50	50
Dehumidification (pints/hr)	1.9	1.9	2.7	2.7	3.8	3.8	4.4	4.4
Net Weight	110	110	120	120	130	130	140	140
Shipping Weight (approx. lbs.)	130	130	140	140	150	150	160	160

NOTES:

1. *All 265V models must use Amana's subbase (PTSB4**C) or Amana's hard wire kit (PTPWHWK4).*
2. *Minimum branch circuit ampacity rating conform to the National Electric Code. However, local codes should apply.*
3. *Minimum voltage on 230/208 volt models is 197 volts; maximum is 253 volts. Minimum voltage on 265 volt models is 238.5 volts; maximum is 291.5 volts.*
4. *Overcurrent protection for all units without electric heaters is 15 amps. Overcurrent protection on 265 volt models must be cartridge-style time delay fuses (included and factory installed on Amana chassis).*
5. *Heating capacity and efficiency are based on unit operation without condensate pump. Unit automatically switches to electric heat at 25°F outdoor coil temperature.*
6. *Total watts for 15,000 Btuh models; subtract 30 watts for PT12*A**AA and 70 watts for PT07/09*A**AA.*
7. *Please specify 2-digit heater kW size to complete model number.*
8. *Total amps for 12,000 and 15,000 Btuh models; subtract 0.2 amps for PT07/09*A*AA.*

EER - *Energy Efficiency Ratio per American Refrigeration Institute (ARI) Test Procedures and Canadian Standards Association (CSA) Test Procedures*

COP - *Coefficient of Performance per ARI Test Procedures*

SPECIFICATIONS

HEATING PERFORMANCE - REVERSE CYCLE								
Heating Capacity Reverse Cycle[1&7]		**PTH073A**AA**	**PTH074A**AA**	**PTH094A**AA**	**PTH123A**AA**	**PTH124A**AA**	**PTH153**AA**	**PTH154A**AA**
Amps		2.6/3.0	2.2	2.6	4.5/5.1	3.9	5.0/5.6	4.1
Watts		575/565	575	770	1,020/1,000	1,020	1,350/1,320	1,350
BTUH[5]		6,800/6,700	6,800	8,500	11,200/11,100	11,200	13,400/13,100	13,400
COP[5]		3.3	3.3	3.2	3.1	3.1	2.9	2.9
CFM (Dry)		235/230	235	234	310/290	310	345/335	345
	Outdoor Ambient °F	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**
	62	8,500/8,400	8,500	10,600/10,500	10,600	13,200/13,000	16,500/16,200	16,500
	57	7,900/7,800	7,900	10,000/9,900	10,000	12,400/12,200	15,500/15,200	15,500
	52	7,200/7,100	7,200	9,300/9,200	9,300	11,600/11,400	14,400/14,100	14,400
	47	6,500/6,400	6,500	8,400/8,300	8,400	10,800/10,600	13,400/13,100	13,400
Rating Point	**(COP)**	**3.3/3.3**	**3.3**	**32./3.2**	**3.2**	**3.1/3.1**	**2.9/2.9**	**2.9**
	452	5,800/5,700	5,800	7,600/7,500	7,600	10,000/9,800	12,300/12,100	12,300
	37	5,200/5,100	5,200	6,800/6,700	6,800	9,200/9,000	11,400/11,200	11,400
	32	4,600/4,500	4,600	6,000/5,900	6,000	8,400/8,200	10,300/10,100	10,300
	Outdoor Ambient °F	**Watts**	**Watts**	**Watts**	**Watts**	**Watts**	**Watts**	**Watts**
	62	600/650	660	860	860	1,120/1,100	1,500/1,470	1,500
	57	635/625	635	830	830	1,090/1,070	1,450/1,420	1,450
	52	600/590	600	800	800	1,050/1,030	1,400/1,380	1,400
	47	575/565	575	770	770	1,020/1,000	1,350/1,320	1,350
	42	550/540	550	840	740	990/970	1,290/1,265	1,290
	37	525/515	525	710	710	950/930	1,225/1,200	1,225
	32	500/490	500	680	680	920/900	1,170/1,140	1,170

COOLING DATA (COOLING with ELECTRIC HEAT)								
	PTC073AAB PTC073A**AC**	**PTC074A**AB PTC074A**AC**	**PTC093A**AB PTC093A**AC**	**PTC094A**AB PTC094A**AC**	**PTC123A**AB PTC123A**AC**	**PTC124A**AB PTC124A**AC**	**PTC153A**AB PTC153A**AC**	**PTC154A**AB PTC154A**AC**
Voltage[1&3]	230/208	265	230/208	265	230/208	265	230/208	265
Capacity (BUTH)	7,100/7,000	7,100	9,100/8,900	9,100	12,000/11,900	12,000	14,200/14,000	14,200
Amps	2.8/3.0	2	3.7/3.8	3	4.6/5.0	4.3	6.3/6.9	5.9
Watts	610/600	610	805/785	805	1,120/1,110	1,130	1,545/1,520	1,525
EER	11.6	11.6	11.3	11.3	10.7	10.7	9.2	9.3
UNIT WITHOUT ELECTRIC HEATER Minimum Circuit Ampacity[2&4]	4.0	3.6	5.1	4.4	6.4	5.7	8.4	7.4
CFM	**Cool, Wet Coil**							
HIGH	245/240	245	245/240	245	325/315	325	325/315	325
LOW	220/205	220	220/205	220	250/229	250	250/220	250
	Dry Coil							
HIGH	265/260	265	265/260	265	345/335	345	345/335	345
LOW	230/215	230	230/215	230	265/235	265	265/235	265
	Ventilated Air							
FAN ONLY*	65*	65*	65*	65*	70*	70*	70*	70*
COMPRESSOR & FAN*	65*	65*	65*	65*	70*	70*	70*	70*
Dehumidification (pints/hr)	1.6	1.6	2.6	2.6	3.5	3.5	4.4	4.4
Net Weight	90	90	95	95	105	105	110	110
Shipping Weight (approx. lbs.)	105	105	110	110	120	120	125	125

NOTES:

*1. All 265V models must use Amana's subbase (PTSB4**C) or Amana's hard wire kit (PTPWHWK4).*
2. Minimum branch circuit ampacity rating conform to the National Electric Code. However, local codes should apply.
3. Minimum voltage on 230/208 volt models is 197 volts; maximum is 253 volts. Minimum voltage on 265 volt models is 238.5 volts; maximum is 291.5 volts.
4. Overcurrent protection for all units without electric heaters is 15 amps. Overcurrent protection on 265 volt models must be cartridge-style time delay fuses (included and factory installed on Amana chassis).
5. Heating capacity and efficiency are based on unit operation without condensate pump. Unit automatically switches to electric heat at 25°F outdoor coil temperature.
*6. Total watts for 15,000 Btuh models; subtract 30 watts for PT12*A**AA and 70 watts for PT07/09*A**AA.*
7. Please specify 2-digit heater kW size to complete model number.
*8. Total amps for 12,000 and 15,000 Btuh models; subtract 0.2 amps for PT07/09*A*AA.*

EER - *Energy Efficiency Ratio per American Refrigeration Institute (ARI) Test Procedures and Canadian Standards Association (CSA) Test Procedures*

COP - *Coefficient of Performance per ARI Test Procedures*

SPECIFICATIONS

HEATING PERFORMANCE - REVERSE CYCLE

Heating Capacity Reverse Cycle[1&7]		PTH073A**AB PTH073A**AC	PTH074A**AB PTH074A**AC	PTH093A**AB PTH093A**AC	PTH094A**AB PTH094A**AC	PTH123A**AB PTH123A**AC	PTH124A**AB PTH124A**AC	PTH153A**AB PTH153A**AC	PTH154A**AB PTH154A**AC
Amps		2.6/3.0	2.2	3.2/3.6	2.6	4.5/5.1	3.9	5.7/6.3	5.4
Watts		570/550	570	740/730	740	1,020/1,000	1,020	1,390/1,380	1,390
BTUH[5]		6,400/6,200	6,400	8,100/8,000	8,100	10,800/10,600	10,800	13,300/13,200	13,300
COP[5]		3.3	3.3	3.2	3.2	3.1	3.1	2.8	2.8
CFM (Dry)		235/230	235	235/230	230	310/290	310	345/335	345
	Outdoor Ambient °F	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**
	62	8,400/8,200	8,400	10,300/10,200	10,300	13,200/13,000	13,200	16,400/16,300	16,400
	57	7,800/7,600	7,800	9,700/9,600	9,700	12,400/12,200	12,400	15,400/15,300	15,400
	52	7,100/6,900	7,100	9,000/8,900	9,000	11,600/11,400	11,600	14,300/14,200	14,300
	47	6,400/6,200	6,400	8,100/8,000	8,100	10,800/10,600	10,800	13,300/13,200	13,300
Rating Point	**(COP)**	**3.3/3.3**	**3.3**	**32./3.2**	**3.2**	**3.1/3.1**	**2.9/2.9**	**2.9**	**2.9**
	452	5,700/5,500	5,700	7,300/7,200	7,300	10,000/9,800	10,000	12,300/12,200	12,300
	37	5,100/4,900	5,100	6,500/6,400	6,500	9,200/9,000	9200	11,300/11,200	11,300
	32	4,500/4,300	4,500	5,700/5,600	5,700	8,400/8,200	8400	10,200/10,100	10,200
	Outdoor Ambient °F	**Watts**	**Watts**	**Watts**	**Watts**	**Watts**	**Watts**	**Watts**	**Watts**
	62	645/625	645	835/825	835	1,151/1,095	1,115	1,540/1,530	1,540
	57	630/610	630	805/795	805	1,085/1,065	1,085	1,500/1,490	1,500
	52	595/575	595	780/770	780	1,055/1,035	1,055	1,450/1,440	1,450
	47	570/550	570	740/730	740	1,020/1,000	1,020	1,390/1,380	1,390
	42	540/520	540	710/700	710	985/965	985	1,335/1,325	1,335
	37	515/505	515	675/665	675	945/925	945	1,250/1,240	1,250
	32	495/485	495	630/620	630	915/895	915	1,170/1,160	1,170
	27	460/450	460	590/580	590	885/865	885	1,110/1,090	1,100

COOLING DATA (HEAT PUMP)

	PTH073A**AB PTH073A**AC	PTH74A**AB PTH074A**AC	PTH093A**AB PTH093A**AC	PTH094A**AB PTH094A**AC	PTH123A**AB PTH123A**AC	PTH124A**AB PTH124A**AC	PTH153A**AB PTH153A**AC	PTH154A**AB PTH154A**AC
Voltage[1&3]	230/208	265	230/208	265	230/208	265	230/208	265
Capacity (BUTH)	7,100/7,000	7,100	9,000/8,800	9,000	12,000/11,800	12,000	14,000/13,800	14,000
Amps	2.8/3.0	2.3	3.5/3.8	3.0	4.6/5.0	4.3	6.3/6.9	5.9
Watts	651/610	615	805/785	805	1,120/1,110	1,120	1,505/1,485	1,505
EER	11.5	11.5	11.2	11.2	10.7	10.7	9.3	9.3
UNIT WITHOUT ELECTRIC HEATER Minimum Circuit Ampacity[2&4]	4.0	3.6	5.1	4.4	6.4	5.7	8.4	7.4
CFM	**Cool, Wet Coil**							
HIGH	245/240	245	245/240	245	325/315	325	325/315	325
LOW	220/205	220	220/205	220	250/229	250	250/220	250
	Dry Coil							
HIGH	265/260	265	265/260	265	345/335	345	345/335	345
LOW	230/215	230	230/215	230	265/235	265	265/235	265
	Ventilated Air							
FAN ONLY*	65*	65*	65*	65*	70*	70*	70*	70*
COMPRESSOR & FAN*	65*	65*	65*	65*	70*	70*	70*	70*
Dehumidification (pints/hr)	1.6	1.6	2.6	2.6	3.5	3.5	4.4	4.4
Net Weight	95	90	100	100	110	110	115	115
Shipping Weight (approx. lbs.)	110	110	115	115	125	125	130	130

NOTES:

1. *All 265V models must use Amana's subbase (PTSB4**C) or Amana's hard wire kit (PTPWHWK4).*
2. *Minimum branch circuit ampacity rating conform to the National Electric Code. However, local codes should apply.*
3. *Minimum voltage on 230/208 volt models is 197 volts; maximum is 253 volts. Minimum voltage on 265 volt models is 238.5 volts; maximum is 291.5 volts.*
4. *Overcurrent protection for all units without electric heaters is 15 amps. Overcurrent protection on 265 volt models must be cartridge-style time delay fuses (included and factory installed on Amana chassis).*
5. *Heating capacity and efficiency are based on unit operation without condensate pump. Unit automatically switches to electric heat at 25°F outdoor coil temperature.*
6. *Total watts for 15,000 Btuh models; subtract 30 watts for PT12*A**AA and 70 watts for PT07/09*A**AA.*
7. *Please specify 2-digit heater kW size to complete model number.*
8. *Total amps for 12,000 and 15,000 Btuh models; subtract 0.2 amps for PT07/09*A*AA.*

EER - *Energy Efficiency Ratio per American Refrigeration Institute (ARI) Test Procedures and Canadian Standards Association (CSA) Test Procedures*

COP - *Coefficient of Performance per ARI Test Procedures*

SPECIFICATIONS

COOLING DATA (COOLING with ELECTRIC HEAT)								
	PTC073B*E PTC073B***G PTC073B***J PTC073B***K**	**PTC074B***E PTC074B***G PTC074B***J PTC074B***K**	**PTC093B***E PTC093B***G PTC093B***J PTC093B***K**	**PTC094B***E PTC094B***G PTC094B***J PTC094B***K**	**PTC123B***E PTC123B***G PTC123B***J PTC123B***K**	**PTC124B***E PTC124B***G PTC124B***J PTC124B***K**	**PTC153B***E PTC153B***G PTC153B***J PTC153B***K**	**PTC154B***E PTC154B***G PTC154B***K PTC154B***J**
Voltage[1&3]	230/208	265	230/208	265	230/208	265	230/208	265
Capacity (BUTH)	7,100/6,900	7,100	9,100/8,900	9,100	12,000/11,900	12,000	14,000/13,900	14,000
Amps	2.8/3.0	2	3.7/3.8	3	4.6/5.0	4.3	6.3/6.9	5.9
Watts	610/595	610	790/775	790	1,110/1,100	1,130	1,470/1,450	1,470
EER	11.6	11.6	11.5	11.5	10.8	10.8	9.5	9.5
UNIT WITHOUT ELECTRIC HEATER Minimum Circuit Ampacity[2&4]	4.0	3.6	5.1	4.4	6.4	5.7	8.8	7.7
CFM	**Cool, Wet Coil**							
HIGH	245/240	245	245/240	245	325/315	325	325/315	325
LOW	220/205	220	220/205	220	250/229	250	250/220	250
	Dry Coil							
HIGH	265/260	265	265/260	265	345/335	345	345/335	345
LOW	230/215	230	230/215	230	265/235	265	265/235	265
	Ventilated Air							
COMPRESSOR & FAN*	65	65	65	65	70	70	70	70
Dehumidification (pints/hr)	1.6	1.6	2.6	2.6	3.5	3.5	4.4	4.4
Net Weight	90	90	95	95	105	105	110	110
Shipping Weight (approx. lbs.)	105	105	110	110	120	120	125	125

**Approximately 95 CFM with optional power vent kit. Actual vent CFM performance will vary due to application and installation conditions.*

COOLING DATA (COOLING with ELECTRIC HEAT)								
	PTH073B*E PTH073B***G PTH073B***J PTH073B***K**	**PTH074B***E PTH074B***G PTH074B***J PTH074B***K**	**PTH093B***E PTH093B***G PTH093B***J PTH093B***K**	**PTH094B***E PTH094B***G PTH094B***J PTH094B***K**	**PTH123B***E PTH123B***G PTH123B***J PTH123B***K**	**PTH124B***E PTH124B***G PTH124B***J PTH124B***K**	**PTH153B***E PTH153B***G PTH153B***J PTH153B***K**	**PTH154B***E PTH15AB***G PTH15AB***J PTH15AB***K**
Voltage[1&3]	230/208	265	230/208	265	230/208	265	230/208	265
Capacity (BUTH)	7,000/6,800	7,000	9,100/8,900	9,100	12,000/11,800	12,000	14,000/13,900	14,000
Amps	2.8/3.0	2	3.5/3.8	3	4.6/5.0	4.3	6.3/6.9	5.9
Watts	605/585	605	790/775	790	1,110/1,090	1,110	1,505/1,495	1,505
EER	11.6	11.6	11.5	11.5	10.8	10.8	9.3	9.3
UNIT WITHOUT ELECTRIC HEATER Minimum Circuit Ampacity[2&4]	4.0	3.6	5.1	4.4	6.4	5.7	8.8	7.7
CFM	**Cool, Wet Coil**							
HIGH	245/240	245	245/240	245	325/315	325	325/315	325
LOW	220/205	220	220/205	220	250/229	250	250/220	250
	Dry Coil							
HIGH	265/260	265	265/260	265	345/335	345	345/335	345
LOW	230/215	230	230/215	230	265/235	265	265/235	265
	Ventilated Air							
COMPRESSOR & FAN*	65	65	65	65	70	70	70	70
Dehumidification (pints/hr)	1.6	1.6	2.6	2.6	3.5	3.5	4.4	4.4
Net Weight	95	95	100	100	110	110	115	115
Shipping Weight (approx. lbs.)	110	110	115	115	125	125	130	130

NOTES:

*1. All 265V models must use Amana's subbase (PTSB4**D) or an Amana® brand hard wire kit (PTPWHWK4).*
2. Minimum branch circuit ampacity ratings conform to the National Electric Code. However, local codes should apply.
3. Minimum voltage on 230/208 volt models is 197 volts; maximum is 253 volts. Minimum voltage on 265 volt models is 238.5 volts; maximum is 291.5 volts.
*4. Overcurrent protection for **all units without electric heaters** is 15 amps. Overcurrent protection on 265 volt models must be cartridge-style time delay fuses (included and factory installed on Amana® brand all 265 volt chassis).*
5. Heating capacity and efficiency are based on unit operation without condensate pump. Unit automatically switches to electric heat at approximately 24°F outdoor ambient.
*6. Total watts for 12,000 and 15,000 Btuh models. Subtract 70 watts for PT107/09*B*AE.*
7. Please specify 2-digit heater kW size to complete model number.
9. Refrigerant used in all systems is R-22.
*8. Total amps for 12,000 and 15,000 Btuh models; subtract 0.2 amps for PT07/09*B*AE.*
10. All units meet or exceed ASHRAE 90.1 standards..

SPECIFICATIONS

HEATING PERFORMANCE - REVERSE CYCLE									
Heating Capacity Reverse Cycle[1&7]		**PTH073B***E PTH073B***G PTH073B***J PTH073B***K**	**PTH074B***E PTH074B***G PTH074B***J PTH074B***K**	**PTH093B***E PTH093B***G PTH093B***J PTH093B***K**	**PTH094B***E PTH094B***G PTH094B***J PTH094B***K**	**PTH123B***E PTH123B***G PTH123B***J PTH123B***K**	**PTH124B***E PTH124B***G PTH124B***J PTH124B***K**	**PTH153B***E PTH153B***G PTH153B***J PTH153B***K**	**PTH154B***E PTH154B***G PTH154B***G PTH154B***G**
Amps		6,200/6,000	6200	8,200/8,000	8200	10,800/10,600	10800	13,300/13,200	13,300
Watts		2.6/3.0	2.2	3.2/3.6	2.6	4.5/5.1	3.9	5.7/6.3	5.4
BTUH[5]		550/530	550	750/730	750	1020/1,000	1020	1,340/1,330	1,340
COP[5]		3.3	3.3	3.2	3.2	3.1	3.1	2.9	2.9
CFM (Dry)		235/230	235	235/230	230	310/290	310	345/335	345
	Outdoor Ambient ºF	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**	**Heating BTUH Note 5**
	62	7,200/7,000	7,200	9,800/9,600	9,800	13,000/12,800	13,000	15,800/15,700	15,800
	57	6,900/6,700	6,900	9,300/9,100	9,300	12,300/12,100	12,300	15,000/14,900	15,000
	52	6,500/6,300	6,500	8,700/8,500	8,700	11,600/11,400	11,600	14,200/14,100	14,200
	47	6,200/6,000	6,200	8200/8,000	8,200	10,800/10,600	10,800	13,300/13,200	13,300
Rating Point	**(COP)**	**3.3/3.3**	**3.3**	**3.2/3.2**	**3.2**	**3.1/3.1**	**3.1**	**2.9/2.9**	**2.9**
	452	5,900/5,700	5,900	7,700/7,500	7,700	10,100/9,900	10,100	12,500/12,400	12,500
	37	5,600/5,400	5,500	7,200/7,00	7,200	9,400/9,200	9,400	11,700/11,600	11,700
	32	5,300/5,100	5,200	6,700/6,500	6,700	7,900/7,700	7,900	10,000/9,900	10,000
	Outdoor Ambient ºF	**Watts**	**Watts**	**Watts**	**Watts**	**Watts**	**Watts**	**Watts**	**Watts**
	62	580/560	580	810/790	810	1,120/1,100	1,120	1,465/1,455	1,465
	57	575/555	575	800/780	800	1,090/1,075	1,090	1,440/1,430	1,440
	52	555/535	555	775/755	775	1,060/1,045	1,060	1,405/1,395	1,405
	47	550/530	550	750/730	750	1,020/1,005	1,020	1,340/1,330	1,340
	42	540/525	560	730/710	730	985/970	985	1,325/1,315	1,325
	37	530/515	545	705/685	705	950/935	950	1,285/1,275	1,285
	32	515/500	535	690/670	690	900/885	900	1,240/1,230	1,190

HEAT PERFORMANCE (ELECTRIC HEAT) ELECTRIC DATA (ALL BTUH SIZES, ALL MODELS)										
Voltage	**Electric Heater Size (kW)**	**Number of Stages**	**Nominal Heating (BTUH)**			**Total Watts**	**Total Amps**	**Minimum Ampacity[1]**	**Overcurrent Protection[5]**	**Power Cord[1]**
			230V	**208V**	**265V**					
230/208	2.5/2.0	1	8,500	6,800		2,650/2,140	11.5/10.2	14.2	15	6 - 15 P
230/208	3.5/2.9	1	12,000	9,900		3,650/3,040	15.8/14.5	19.6	20	6 - 20 P
230/208	5.0/4.1	1 or 2	17,100	14,000		5,150/4,240	22.3/20.3	27.8	30	6 -30 P
265	2.5	1			8,500	2,650	10.0	12.4	15	7 - 20 P
265	3.5	1			12,600	3,850	14.6	18.1	20	7 - 20 P
265	5.0	1 or 2			17,100	5,150	19.5	24.2	25	7 - 30 P

NOTES:

*1. All 265V models must use Amana's subbase (PTSB4**D) or an Amana® brand hard wire kit (PTPWHWK4).*
2. Minimum branch circuit ampacity ratings conform to the National Electric Code. However, local codes should apply.
3. Minimum voltage on 230/208 volt models is 197 volts; maximum is 253 volts. Minimum voltage on 265 volt models is 238.5 volts; maximum is 291.5 volts.
*4. Overcurrent protection for **all units without electric heaters** is 15 amps. Overcurrent protection on 265 volt models must be cartridge-style time delay fuses (included and factory installed on Amana® brand all 265 volt chassis).*
5. Heating capacity and efficiency are based on unit operation without condensate pump. Unit automatically switches to electric heat at approximately 24°F outdoor ambient.
*6. Total watts for 12,000 and 15,000 Btuh models. Subtract 70 watts for PT107/09*B*AE.*
7. Please specify 2-digit heater kW size to complete model number.
9. Refrigerant used in all systems is R-22.
*8. Total amps for 12,000 and 15,000 Btuh models; subtract 0.2 amps for PT07/09*B*AE.*
10. All units meet or exceed ASHRAE 90.1 standards..

SPECIFICATIONS

COOLING DATA (ELECTRIC HEAT)								
	NTE07AA3A**	**NTE07A**A4A**	**NTE09A**A3A**	**NTE09A**A4A**	**NTE12A**A3A**	**NTE12A**A4A**	**NTE15A**A3A**	**NTE15A**A4A**
Voltage[1&3]	230/208	265	230/208	265	230/208	265	230/208	265
Capacity (BUTH)	7,100/6,900	7,100	9,100/8,900	9,100	11,900/11,700	11,900	13,700/13,500	13,700
Amps	2.8/3.0	2.3	3.7/3.8	3.0	4.9/5.3	4.3	6.3/6.9	5.9
Watts	655/640	655	830/810	830	1,165/1,145	1,165	1,540/1,515	1,540
EER	10.8	10.8	11	11	10.2	10.2	8.9	8.9
UNIT WITHOUT ELECTRIC HEATER Minimum Circuit Ampacity[2&4]	4.0	3.6	5.1	4.4	6.4	5.7	8.4	7.4
CFM	**Cool, Wet Coil**							
HIGH	245/240	245	245/240	245	325/315	325	325/315	325
LOW	220/205	220	220/205	220	250/229	250	250/220	250
	Dry Coil							
HIGH	265/260	265	265/260	265	345/335	345	345/335	345
LOW	230/215	230	230/215	230	265/235	265	265/235	265
	Ventilated Air							
FAN ONLY*	65*	65*	65*	65*	70*	70*	70*	70*
COMPRESSOR & FAN*	65*	65*	65*	65*	70*	70*	70*	70*
Dehumidification (pints/hr)	1.6	1.6	2.6	2.6	3.5	3.5	4.4	4.4
Net Weight	90	90	95	95	105	105	110	110
Shipping Weight (approx. lbs.)	105	105	110	110	120	120	125	125

**Approximately 95 CFM with optional power vent kit. Actual vent CFM performance will vary due to application and installation conditions.*

COOLING DATA (HEAT PUMP)								
	NTP07AA3A**	**NTP07A**A4A**	**NTP09A**A3A**	**NTP09A**A4A**	**NTP12A**A3A**	**NTP12A**A4A**	**NTP15A**A3A**	**NTP15A**A4A**
Voltage[1&3]	230/208	265	230/208	265	230/208	265	230/208	265
Capacity (BUTH)	7,000/6,800	7,000	8,900/8,700	8,900	11,600/11,400	11,600	13,700/13,500	13,700
Amps	2.8/3.0	2.3	3.5/3.8	3.0	4.6/5.0	4.3	6.3/6.9	5.9
Watts	655/635	655	825/805	825	1,160/1,140	1,160	1,540/1,515	1,540
EER	10.7	10.7	10.8	10.8	10.0	11.0	8.9	8.9
UNIT WITHOUT ELECTRIC HEATER Minimum Circuit Ampacity[2&4]	4.0	3.6	5.1	4.4	6.4	5.7	8.4	7.4
CFM	**Cool, Wet Coil**							
HIGH	245/240	245	245/240	245	325/315	325	325/315	325
LOW	220/205	220	220/205	220	250/229	250	250/220	250
	Dry Coil							
HIGH	265/260	265	265/260	265	345/335	345	345/335	345
LOW	230/215	230	230/215	230	265/235	265	265/235	265
	Ventilated Air							
FAN ONLY*	65*	65*	65*	65*	70*	70*	70*	70*
COMPRESSOR & FAN*	65*	65*	65*	65*	70*	70*	70*	70*
Dehumidification (pints/hr)	1.6	1.6	2.6	2.6	3.5	3.5	4.4	4.4
Net Weight	95	95	100	100	110	110	115	115
Shipping Weight (approx. lbs.)	110	110	115	115	125	125	130	130

NOTES:

*1. All 265V models must use Amana's subbase (PTSB4**D) or an Amana® brand hard wire kit (PTPWHWK4).*
2. Minimum branch circuit ampacity ratings conform to the National Electric Code. However, local codes should apply.
3. Minimum voltage on 230/208 volt models is 197 volts; maximum is 253 volts. Minimum voltage on 265 volt models is 238.5 volts; maximum is 291.5 volts.
*4. Overcurrent protection for **all units without electric heaters** is 15 amps. Overcurrent protection on 265 volt models must be cartridge-style time delay fuses (included and factory installed on Amana® brand all 265 volt chassis).*
5. Heating capacity and efficiency are based on unit operation without condensate pump. Unit automatically switches to electric heat at approximately 24°F outdoor ambient.
*6. Total watts for 12,000 and 15,000 Btuh models. Subtract 70 watts for PT107/09*B*AE.*
7. Please specify 2-digit heater kW size to complete model number.
9. Refrigerant used in all systems is R-22.
*8. Total amps for 12,000 and 15,000 Btuh models; subtract 0.2 amps for PT07/09*B*AE.*
10. All units meet or exceed ASHRAE 90.1 standards..

SPECIFICATIONS
OPERATING VOLTAGES

⚠ WARNING

USE EXTREME CAUTION WHEN CHECKING HIGH VOLTAGE.

Use a voltmeter, check the voltage at the outlet.

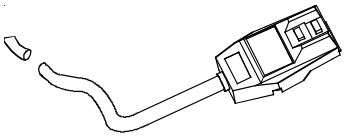
The reading must be within the minimums and maximums shown below for the operating voltage.

Operating Voltages		
Operating Voltage	**Minimum Voltage**	**Maximum Voltage**
230/208	197	253
265	238	291

NOTE:

1. All 265 volt models must use subbase or hard wire kit.
2. Minimum branch circuit ampacity ratings conform to the National Electric Code. However, local codes should apply if in conflict.
3. Minimum voltage on 230/208 volt models is 197 volts; maximum is 253 volts. Minimum on 265 volts is 238 volts; maximum is 291 volts.
4. Overcurrent protection for all units without electric heaters is 15 amps. Overcurrent protection on 265 volt models must be cartridge-style time delay fuses (included and factory installed on chassis).
5. Heating capacity and efficiency is based on unit operation without condensate pump. Unit automatically switches to electric heat at 25° F outdoor coil temperature.
6. Total watts for 15,000 BTUH models; subtract 30 watts for PT*12*A**AA and 70 watts for PT*07/09*A**AA.
7. Please specify 2-digit heater kW size to compete model number.
8. Total amps for 12,000 and 15,000 BTUH models; subtract 0.2 amps for PT*07/09*A**AA

- **LCDI or AFCI Power Cords** - Underwrites Laboratories and the National Electric Code (NEC) now require power cords that sense current leakage and can open the electrical circuit to the unit on units rated at 250 volts or less. In the event that unit does not operate, check the reset button located on or near the head of the power cord as part of the normal troubleshooting procedure.



LCDI Power Cord

PROPER INSTALLATION

WALL SLEEVE INSTALLATION

⚠ WARNING

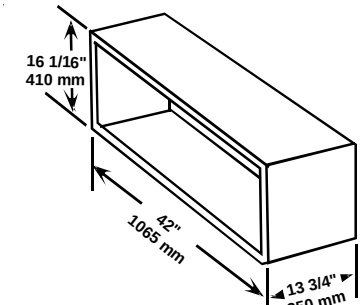
HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

The wall sleeve must be installed before the air conditioner or heat pump chassis can be set in place. Read the instructions thoroughly before proceeding.

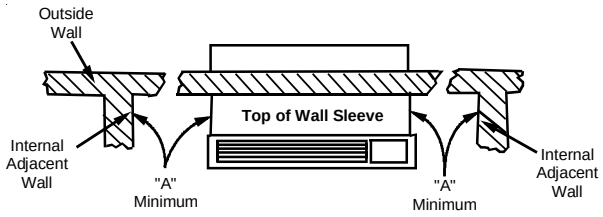
Pre-installation Considerations

Before proceeding with the sleeve installation, ensure the following guidelines for locating the wall opening and sleeve are met:

- The wall opening must be the correct size. See the figures below for wall sleeve Dimensions and minimum wall opening size.



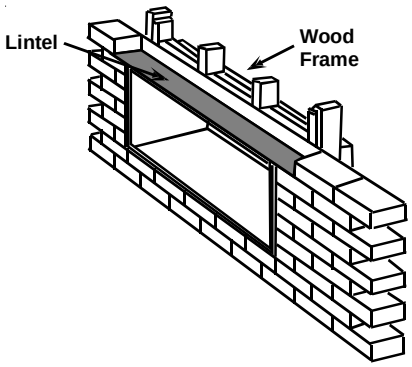
Wall Sleeve Dimensions



Allow Front Clearance (See Table 1)

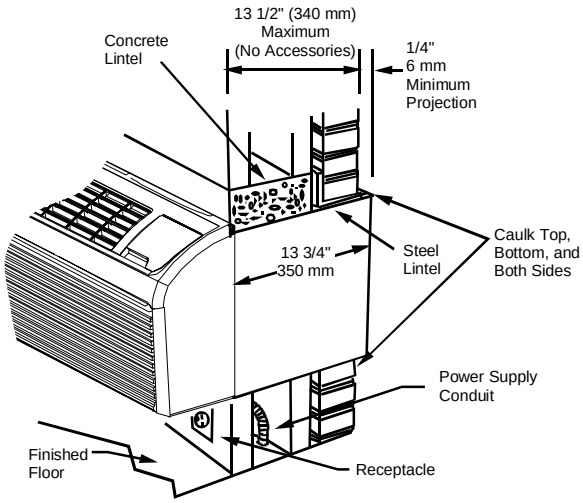
Minimum Unit Clearances

- The wall sleeve will need to be installed with minimum clearances to the floor and adjacent walls. Minimum projections of the sleeve into and out of the room will also have to be met. See Minimum Unit Clearances and Minimum Interior and Exterior Projections Figures as well as Minimum Clearances and Projections table for details.
- If installed in a concrete or masonry wall, a lintel must be provided in the wall opening for support. **Do not use the wall sleeve as a lintel.** See Framing with Lintel Figure for a typical lintel construction.



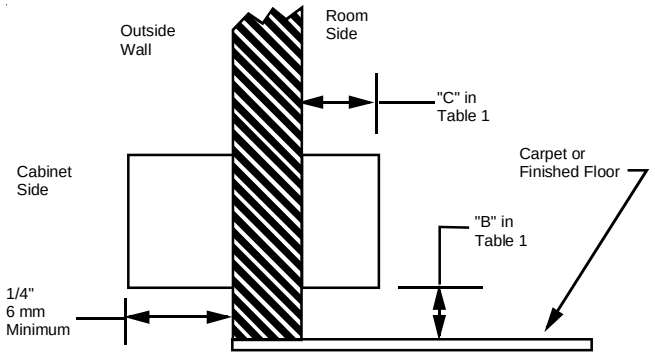
Framing with Lintel

- When installed in the opening, the wall sleeve must be horizontally level from side to side and pitched (one quarter bubble in the sight glass) to the outside. DO NOT INSTALL LEVEL (FRONT TO BACK) OR SLOPE THE WALL SLEEVE TOWARD THE ROOM.
- The installer must determine and supply the mounting bolts and/or screws to attach the wall sleeve to the sides of the wall opening. Make sure the wall opening is adequate for strong support.
- The installer must provide adequate sealing and insulation around the sleeve after it is installed (air and water tight). See Block and Brick Veneer Installation Figure for one of many types of constructions.

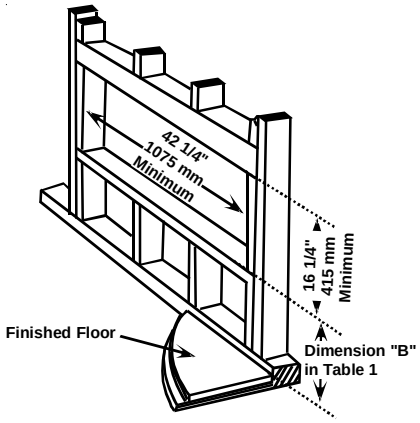


Block and Brick Veneer Installation

PROPER INSTALLATION



Minimum Interior and Exterior Projections



MINIMUM CLEARANCES AND PROJECTIONS						
Option	Minimum Clearances				Minimum Projection	
	A		B		C	
	in.	mm	in.	mm	in.	mm
Wall Sleeve Only	3	75	0	0	0	0
Subbase Kit	3	75	3 1/4	85	2 3/4	70
Leveling Legs Kit	3	75	3	75	2	50
Duct Kit	3	75	0	0	1 3/8	35
Drain Kit	3	75	0[1]	0[1]	0	0
Hard Wire Kit	3	75	1 1/4	30	0	0
Hydronic Heat Kit "A" Series	9	230	0 to 3 1/4[3]	0 to 85[3]	32	752
Hydronic Heat Kit "J" Series	6	150	0	0	2 1/2	65

[1] If inside mounted then B = 1 1/2 inches (40 mm).

[2] To achieve a flush fit between the hydronic front and the finished wall, Dimension “C” must be between 3” and 3 1/8”. If this dimension is more than 3 1/8” there will be a gap between the front and the wall. This gap could permit occupant access to hydronic lines or other dangerous parts.

[3] This dimension can be from 0” to 3-1/4”, but cannot exceed 3-1/4”. If this dimension exceeds 3-1/4”, the skirt around the front will not reach the floor.

- For installations in walls deeper than 13-1/2 inches, special care is necessary to prevent problems with rain water, condensate drainage and intake/discharge air. Under these circumstances, careful job site analysis and precautions are required. You must consult with your Sales Representative and receive approval before attempting such installations.
- If used, a 230/208 volt wall receptacle must be located within 58 inches of the lower right sleeve corner. Extension cords must not be used with the unit. See the note on Wall Sleeve Dimensions Figure.

Minimum Wall Opening Dimensions

When 230/208 volt units are to be installed, the power supply may be either cord connected or permanent wiring. Permanent wiring may be done through the accessory hard wire junction box, or the accessory subbase.

When 265 volt units are to be installed, the power supply must be permanent wiring. Permanent wiring may be done through the accessory hard wire junction box, or the accessory subbase. **An exposed cord connection on 265 volt units is not permitted.**

The subbase accessory includes leveling legs. If added wall sleeve support is required and the subbase is not to be used as an accessory, leveling leg kit may be installed.

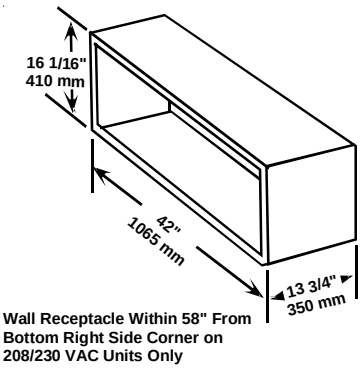
Drain Kit

An indoor/outdoor drain kit is available as an accessory item. When a drain kit is to be installed, do so before installing the wall sleeve in the wall. See the drain kit for actual installation instructions.

Subbase, Leveling Legs, Main Duct, and Hydronic Heat Kits

Installation of these kits requires drilling of mounting holes on both sides of the wall sleeve. The minimum required clearance distance between the wall sleeve and wall is shown in Minimum Clearances and Projections Table. If the distance between wall sleeve and wall will be at or near the minimum clearance distance, mount these kits on the sleeve before installing the sleeve in the wall. The kit installation instructions are included with the accessory kits.

PROPER INSTALLATION



Wall Sleeve Dimensions

Outside Enclosure Panel Removal

The sleeve stiffener must be taken out before the enclosure panel can be removed from the sleeve.

The enclosure panel can be removed by folding the four flaps up and downward and manipulating the front ends of the top plus bottom towards the center. The entire panel can be pulled out diagonally from one side.

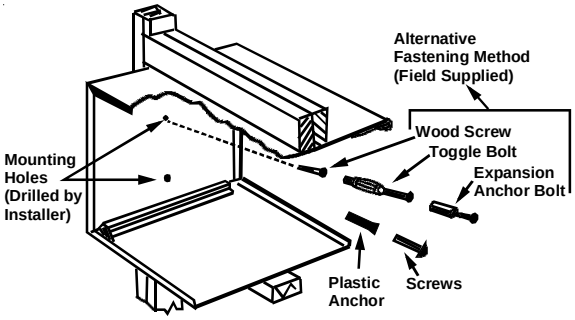
Install the wall sleeve condenser air grille by using the screws and holes provided.

Installation (WS900B or WS900D)

After the wall opening is checked and approved for location, size, and clearances, complete the following to install the wall sleeve.

NOTE: Check with Amana® Technical Service when a chassis is installed in any wall sleeve not supplied by Goodman.

1. Remove the outside enclosure panel from the wall sleeve.
2. Slide the wall sleeve into the wall opening. Do not distort the cabinet shape to fit the wall opening. The unit chassis must fit snugly and uniformly into the wall sleeve.
3. Locate the sleeve within the range of minimum projections, as shown in Minimum Wall Opening Dimensions and Minimum Interior and Exterior Projections Figures, so both sides are at least the minimum projection from the wall.
4. Check the level of the wall sleeve. For proper drainage, the sleeve should be level from side to side and one-quarter bubble in the sight glass sloping to the outside.
5. Two holes will need to be drilled in both sides of the wall sleeve for mounting into the wall. Drill holes of proper size and in the proper location so the screws will engage into strong supporting members of the wall. **DO NOT DRILL THROUGH BOTTOM OF SLEEVE.** The following figure shows possible fastening methods.



Attaching Wall Sleeve to Opening

6. Check the level of the wall sleeve and adjust if necessary.
7. Caulk or seal around the outside of the entire sleeve.
8. If the unit chassis will not be installed immediately, replace the enclosure panel on the outside opening of the sleeve. This will prevent weather damage to the building interior.
9. Recycle or dispose of packaging materials per local codes.

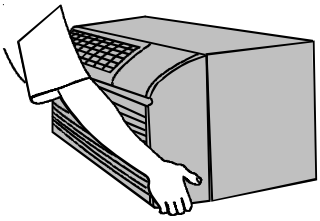
OUTDOOR GRILLE

An outside grille must be installed to direct air flow for proper unit operation and also protect the outdoor coil. The grille must be installed before installing the chassis. Refer to the Installation Instructions supplied with the outdoor grille kit for a complete description of the installation procedure.

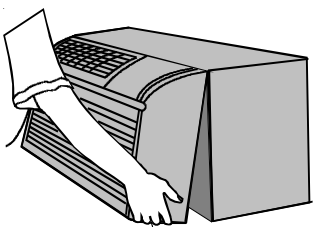
This model requires either a Stamped Grille Kit (Model SGK--B) or an Architectural Grille Kit (Model AGK--B). When replacing an old chassis with an existing grille, please check with your sales representative to determine if the new chassis should be used with the old outdoor grille. An improper outdoor grille can decrease cooling or heating capacity, increase energy usage and shorten compressor life.

FRONT REMOVAL

1. Grasp the cabinet front as shown.



2. Pull the bottom of the cabinet front away from the chassis until the retaining clips disengage.

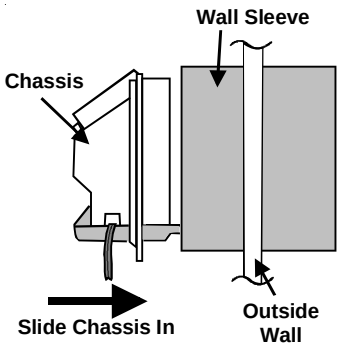


3. Lift the cabinet front off the chassis. Reverse this procedure to reinstall the cabinet front.

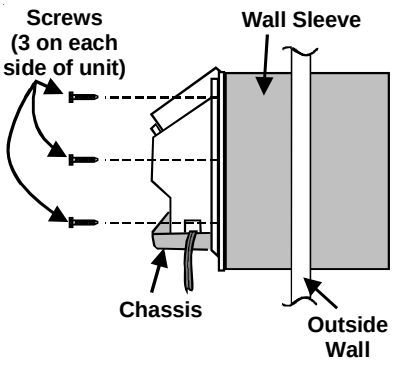
PROPER INSTALLATION

CHASSIS INSTALLATION

1. Remove the cabinet front from the chassis as described in Front Removal.
2. Insert the chassis into the wall sleeve.



3. Slide the chassis into the wall sleeve until the chassis flanges contact the front edge of the wall sleeve.

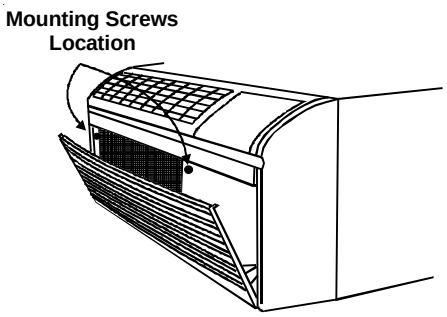


4. Secure the chassis to the wall sleeve using *three* screws on each side of the chassis to ensure a proper seal between the chassis and the wall sleeve. The screws are supplied in a plastic bag which is attached to the power cord.

IMPORTANT NOTES:

1. The unit is equipped with a rubber grommet mounted compressor. These grommets are factory set and require no adjustment.
2. If a standard subbase is used, be sure the right hand subbase cover is removed before the chassis is installed in the sleeve.
3. Check the indoor and outdoor grilles for obstructions to air flow. The unit must be located where curtains, furniture, trees, shrubs or other objects do not block the air flow to and from the unit. If air is obstructed and/or deflected back into the unit, the air conditioner's compressor may cycle on and off rapidly. This could damage the compressor and void the warranty.

Front Mounting Holes - Two mounting holes are provided to give the owner the option of securing the front to the chassis. The mounting holes are located behind the intake grille. The owner must supply two 1/2 inch long #8 sheet metal screws per unit. The two screws must be removed before the front can be removed.



Front Mounting Screws

WIRING

⚠ CAUTION

TO AVOID PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK:

- **DO NOT USE AN EXTENSION CORD WITH THIS UNIT.**
- **USE ONLY COPPER CONDUCTORS.**
- **WIRING TO THE UNIT MUST BE PROPERLY POLARIZED AND GROUNDED.**

Cord connection to a wall socket is not permitted for 265-volt units. All 265-volt units must be hard wired using the hard wire kit or make use of the plug-in receptacle in the standard subbase.

Heaterless Units

If a heaterless unit is ordered, field provisions must be made for supplemental heat if desired. Refer to the Installation Instructions supplied with the heater kit for a complete description of the installation procedures. All 208/230 volt heaterless units are shipped with a 15 Amp power cord and all heaterless 265 volt units are shipped with a 20 Amp power cord.

When adding a heater kit to a unit, the power cord supplied with the heater kit must be used in place of the power cord supplied with the unit. The following table specifies power cord rating requirements for the various heater kits.

POWER CORD REQUIREMENTS

Heater Size (kW)	230/208 Volt Units	265 Volt Units
	Power Cord Rating (amp)	Power Cord Rating (amp)
1.5	15	20
2.5	15	20
3.5	20	Not Applicable
3.7	Not Applicable	20
5	30	30

PROPER INSTALLATION

NOTE: Heaterless units are shipped with an auxiliary data label on the front side of the mid-partition panel. If an electric heater kit is field installed, the installer must mark the appropriate box on the label to indicate the electric heater capacity. If no heater is installed, the box labeled “None” must be marked. Refer to the unit nameplate for over current protection data.

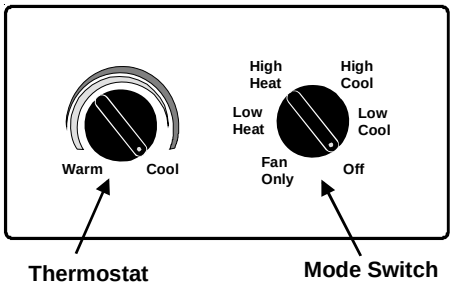
CAUTION

DO NOT INSTALL A 5kW HEATER KIT IN ANY 7,000 OR 9,000 BTU CHASSIS.

OPERATING CONTROLS

Users Controls

Two rotary knobs controlling temperature and operational mode are located behind the control door located to the top-right of the cabinet front.



Thermostat Setting

Turning the thermostat control clockwise will provide a cooler room temperature; turning it counterclockwise will provide a warmer room temperature. Adjusting the thermostat to the mid setting (vertical) will set the room temperature at approximately 75° F.

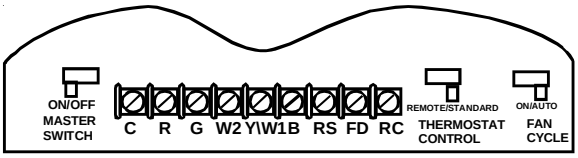
Mode Switch

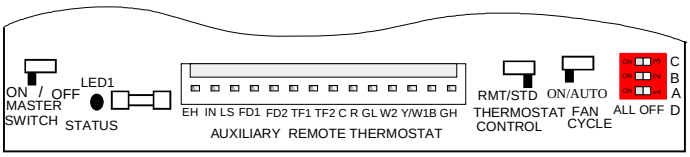
The table below describes the unit function corresponding to the various mode switch settings.

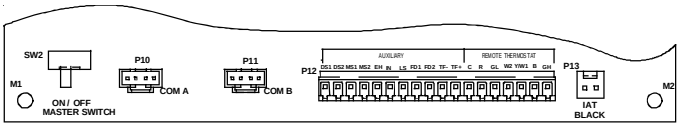
MODE SWITCH SETTINGS	
Switch Position	**Unit Function**
OFF	Unit is completely off. However, before servicing, open all disconnects and/or remove plug.
FAN ONLY	Unit operates on low fan speed to circulate room air.
LOW COOL	Unit operates on the low fan speed to circulate air for cooling.
HIGH COOL	Unit operates on high fan speed to circulate air for cooling.
LOW HEAT	Unit operates on the low fan speed to circulate air for heating.
HIGH HEAT	Unit operates on the high fan speed to circulate air for heating.

Additional Control Inputs (Not used on NTE or NTP Models)

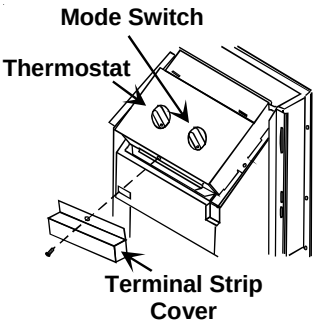
The control inputs shown below provide addition unit control and features. To access these control inputs, the cabinet front must be removed (see Front Removal).







Furthermore, to access the 24V accessory input connections, the terminal strip cover must be removed as shown **(A and B Series units only).**



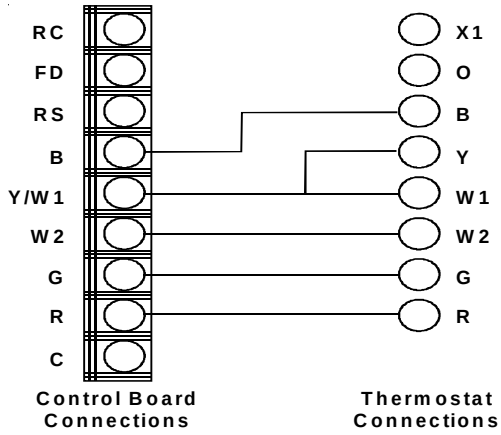
Master Switch (Not used on NTE or NTP Models)

The master switch disconnects power to all of the system components. When this switch is in the off position, the compressor, fan motor, reversing valve, and electric resistance heater will all be de-energized.

PROPER INSTALLATION

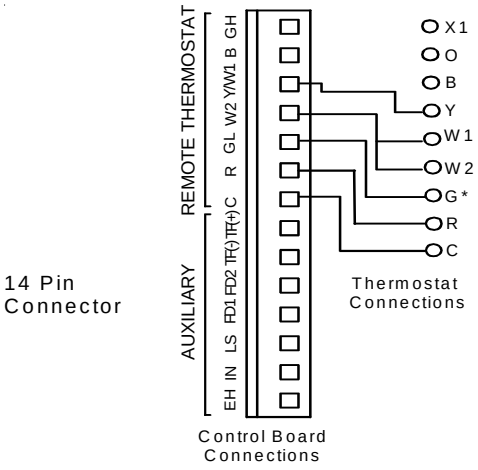
SCHEMATICS BASED ON 1 STAGE COOL, 2 STAGE HEAT MECHANICAL THERMOSTATS

Wiring Schematic for Remote Heat Pump A - B SERIES

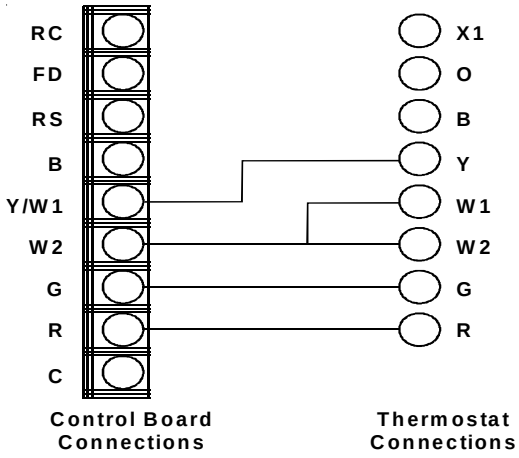


Wiring Schematic for Straight Cool Unit C - E SERIES

***NOTE:** For high speed fan operation, connect “G” to “GH”.

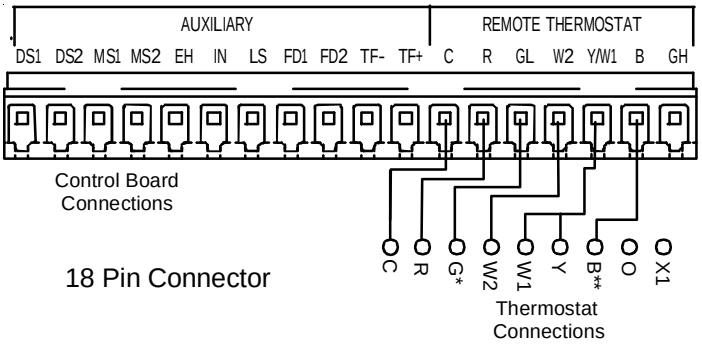


Wiring Schematic for Straight Cool Unit A - B SERIES



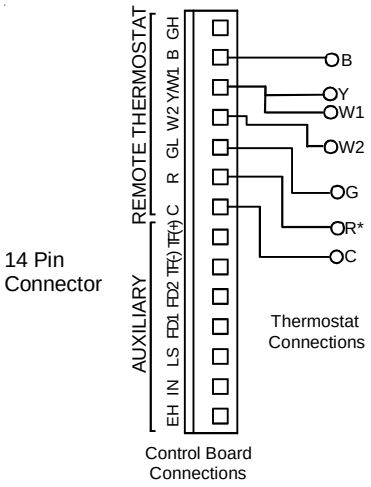
Wiring Schematic for Remote Heat Pump G - L SERIES

***NOTE:** For high speed fan operation, connect “G” to “GH”.



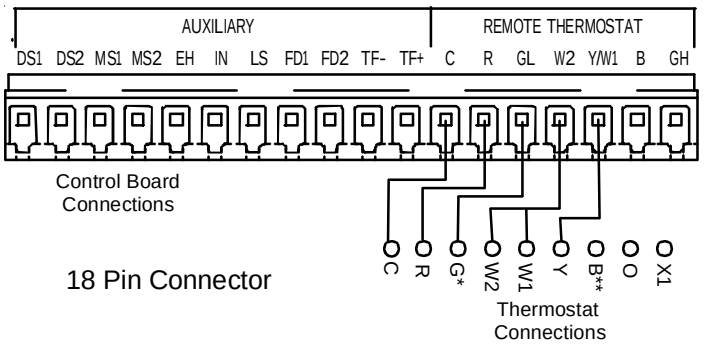
Wiring Schematic for Remote Heat Pump C - E SERIES

***NOTE:** For high speed fan operation, connect “G” to “GH”.



Wiring Schematic for Straight Cool Unit G - L Series

***NOTE:** For high speed fan operation, connect “G” to “GH”.



PROPER INSTALLATION

REMOTE/STANDARD SWITCH (NOT USED ON NTE OR NTP MODELS)

The remote/standard switch is used to change the control of the unit from the standard on board controls in the standard mode, to a remote wall mounted thermostat in the remote mode. For remote control operation refer to Remote Operation section. **To set remote switch on the "G & K" board, see Configuration Settings.**

Fan Cycle Switch

The fan cycle switch sets the operational mode of the fan. In the ON position, the fan will run continuously whenever the unit is in the heat or cool mode. In the AUTO position, the fan will cycle on and off with the compressor or electric heater when the unit is in the cool or heat mode.

Remote Control Inputs (Not used on NTE or NTP Models)

The C, R, G,(GL for low fan speed or GH for high speed fan on "C Models and later") W2, Y/W1 and B terminals provide control inputs for a remote wall mounted thermostat. **See schematics page 17.**

IMPORTANT NOTE: Disconnect power to the unit and/or turn the Master Switch on the control board to OFF when connecting or altering wiring to any terminal. Failure to do so may result in shorting the fuse or damaging the control board**.**

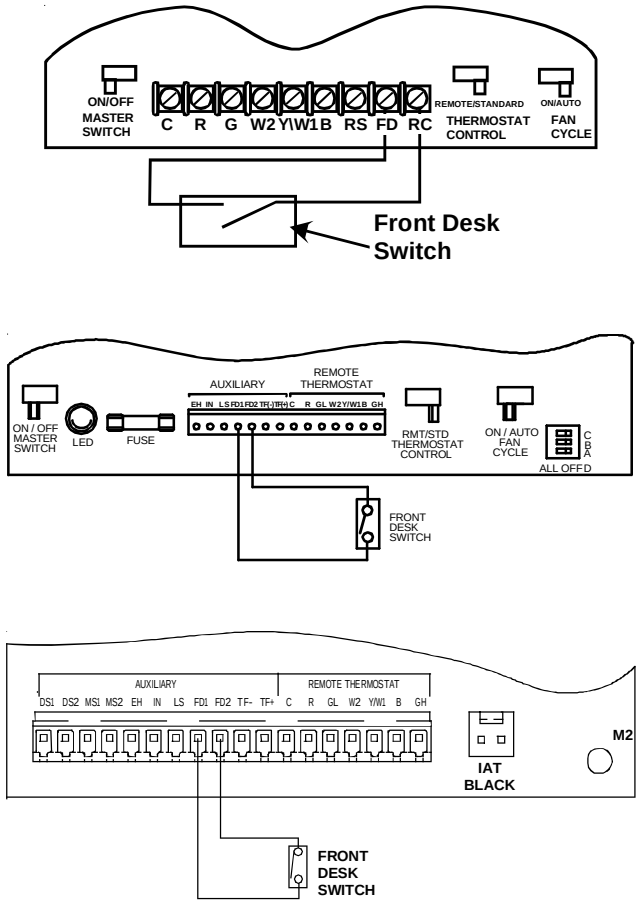
Front Desk Control (Not used on NTE or NTP Models)

The FD and RC terminals or FD1 and FD2 provide control inputs for a front desk switch. Shorting across these two terminals will disable unit operation. The only control function which will remain active when these terminals are shorted is freeze protection. Any switch which will produce a short circuit across these two terminals can be used as a front desk switch. The contact resistance of the switch, when closed, must be less than 200 ohms for the front desk feature to operate properly.

The following table shows the maximum wire length and corresponding gage size for installation of a front desk switch.

MAXIMUM WIRE LENGTH FOR FRONT DESK SWITCH	
Wire Size (AWG)	**Maximum Length Allowed (ft)**
#24	400
#22	600
#20	900
#18	1500
#16	2000

The figures below shows a wiring schematic for connecting the front desk switch to the unit.

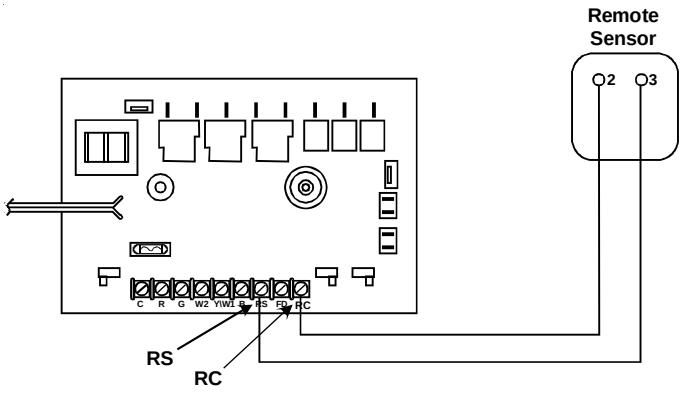


Front Desk Switch Wiring Schematic

IMPORTANT NOTE: Do not apply 24VAC across these terminals. Applying 24VAC to these terminals will result in failure of the control board. Shorting these terminals to any other terminals may also result in control board failure.

Remote Temperature Sensing (Not used on NTE or NTP Models)

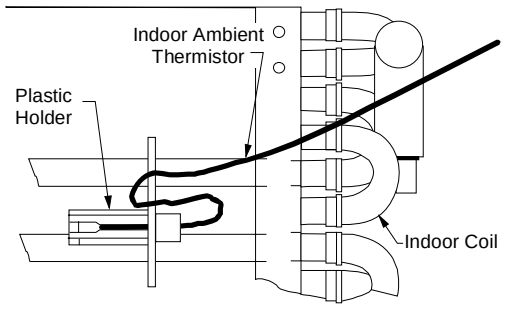
The RS and RC terminals provide control inputs for a remote temperature sensor.



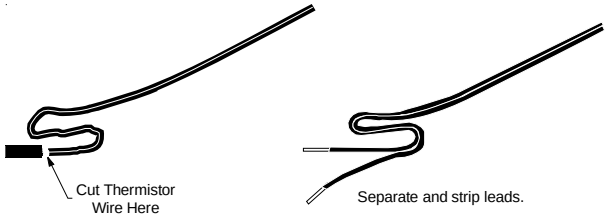
"C" Models or Later

PROPER INSTALLATION

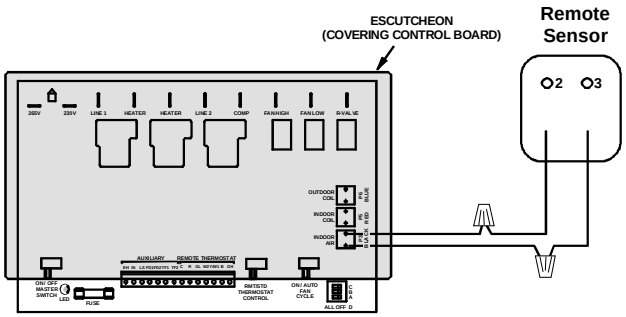
1. Remove indoor ambient thermistor from plastic holder on indoor coil.



2. Cut off end of thermistor, separate leads 1” back from cut and strip 1/2” of insulation from each lead.



3. Wire nut the stripped leads to the two sensor wires running from terminals 2 and 3 on the remote temperature sensor base .



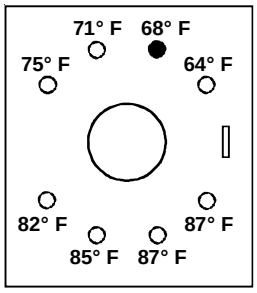
4. Place the mode switch in the “OFF” position. Reestablish power to the unit. The remote temperature will automatically activate.

NOTE: Ensure the mode switch is in the OFF position before electrical power is applied to the unit. If the mode switch is not in the OFF position when electrical power is applied to the unit, the random restart feature will activate causing a two to four minute start-up delay.

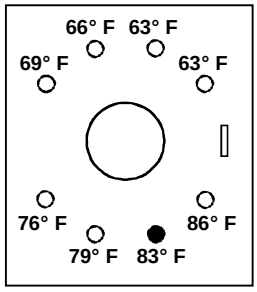
NOTE: Freeze protection temperatures will be sensed by the remote temperature sensing device and not at the PTAC unit (sensed at the PTAC unit when a remote thermostat is used).

Temperature Limiter

The temperature limiting feature can reduce energy costs by controlling the maximum temperature available in heating and the minimum temperature available in cooling. While approximate temperature settings are shown below, actual room temperature will vary slightly.



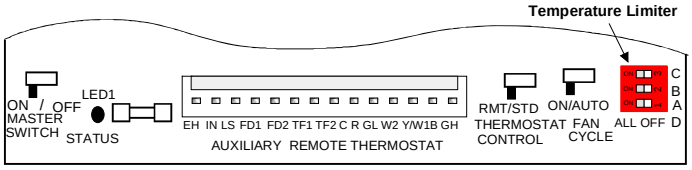
Low End Cooling Limits



High End Heating Limits

Temperature Limiter Settings

The temperature limits are set by selecting the proper holes to use for the limiter screws. The figure above shows the high and low end temperatures corresponding to the various limiter holes. Since these temperatures correspond to the unit's thermistor sensor, actual room temperatures will vary depending on the room heating/cooling load. For example, if the limiter screws are put in the shaded holes, the coolest setting in the cooling mode will be 68° F and the warmest setting in the heating mode will be 83° F.**"A & B model units only, C models and later have DIP Switches to set the limits"**



POSITION	COOL	HEAT
A	70-78	65-73
B	68-81	63-76
C	66-83	61-78
D	63-88	58-83

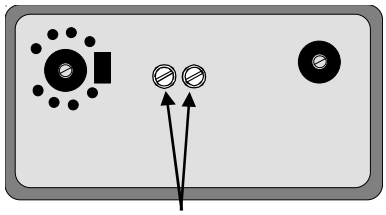
Temperature Settings

NOTE: Select only on pin position.

After determining the temperature limits desired, set the limiter as follows:

1. Remove the front cabinet (see Front Removal) to allow access to the control panel.
2. Remove the unit control knobs by pulling the knobs off the control shafts.
3. Remove the escutcheon plate by lifting it off the control panel cover to expose the temperature limiter as shown.

PROPER INSTALLATION



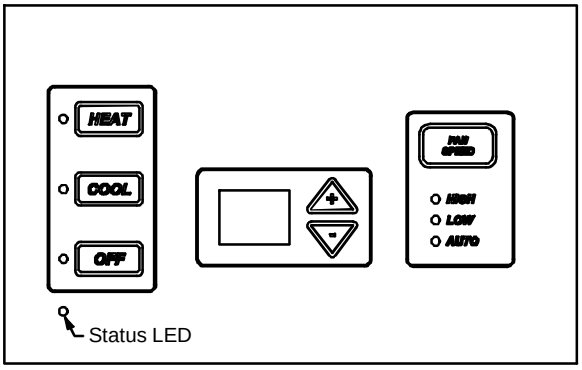
Temperature Limiter

4. Remove the two screws supplied in the top of the control panel cover, and drive them into the desired limiter holes.
5. Replace the escutcheon plate, control knobs and front.

NOTE: To achieve maximum efficiency, it may be necessary to change the temperature limiter screws seasonally.

Users Controls "Digital Touch Pad"

A six button touch key pad located behind the control door controls both temperature and operation mode. The key pads can be used alone or in combination.



User Controls

Thermostat Setting

Pressing the COOL thermostat control and the up or down arrows will provide a cooler room temperature, respectively**.** Pressing the HEAT thermostat control and the up or down arrow keys will provide a warmer room temperature.

Fan Speed

The fan speed touch key will deliver high, low or auto fan speed to circulate room air. NOTE: The AUTO selection will not be available if a fan speed is selected without COOL or Heat selection.

Fan Operation HIGH or LOW with HEAT or COOL mode selected - The selected fan speed shall run in the selected speed.

Fan Operation AUTO with HEAT or COOL mode selected - The fan will run in low and high speed. The changes in fan speed are automatic. See "Configuration Settings" section for further details.

Diagnostic Light

The green diagnostic light located in the lower left hand corner of the touchpad and indicates operation warnings. This light usually indicates that either the filter or coils need cleaning. Please refer to the *Maintenance and Cleaning* section for the proper cleaning procedure. If this light is still on after cleaning, please refer to the *Diagnostic & Status Report* section for assistance.

Additional Control Inputs

The control inputs provide additional unit control and features. To access these control inputs, the cabinet front must be removed (see Front Removal).

Master Switch

The master switch disconnects power to all of the system components. When this switch is in the off position, the compressor, fan motor, reversing valve, and electric resistance heater will all be de-energized.

⚠ WARNING

TO PREVENT PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK, UNPLUG THE UNIT AT THE WALL OUTLET OR TURN OFF POWER AT THE FUSE BOX OR CIRCUIT BREAKER BEFORE SERVICING THE UNIT. LINE VOLTAGE WILL BE PRESENT AT THE CONTROL BOARD, TERMINALS L1 AND L2, WHENEVER POWER IS APPLIED TO THE UNIT REGARDLESS OF THE MASTER SWITCH POSITION.

Remote Control Inputs

The C, R, GL, W2, Y/W1, B/O, and GH terminals provide control inputs for a “manufacturer-approved” remote wall mounted thermostat. The “B” terminal can be configured to become “O” if needed see *Configuration Settings* For remote control thermostat operation, refer to the *Remote Thermostat Operation* section.

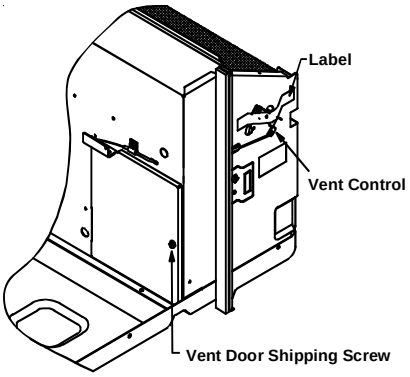
Vent Control

NOTE: Vent control is only used on units with the power vent or power vent door kit not installed.

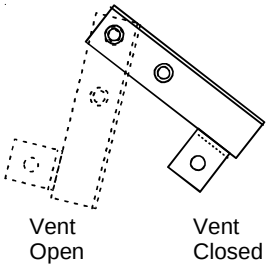
The vent control allows fresh air to be drawn into the conditioned area. This fresh air can provide ventilation when the blower is operating, but it will increase the heating or cooling load and operating costs.

To obtain access to the vent control, remove the cabinet front (see Front Removal). Remove the shipping screw (if installed) from the vent door. Then remove the label (if present) from over the vent control lever on the left side of the chassis.

PROPER INSTALLATION



Rotate the vent control lever to either open or close the damper.

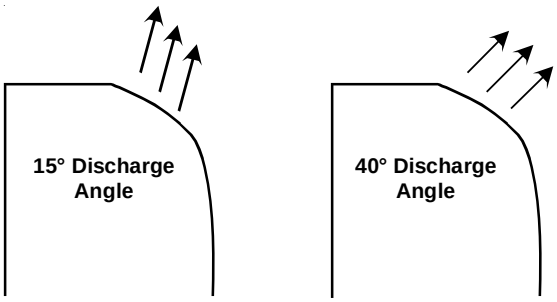


HYDRONIC HEAT INSTALLATIONS

To avoid the risk of freezing the steam or water coil during prolonged shut down periods, the vent door must be left closed when the outdoor temperature might fall below freezing or a power door kit must be installed.

AIR DISCHARGE GRILLE

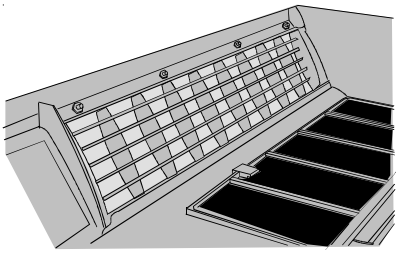
The discharge grille can be adjusted to expel air at either a 15° or 40° angle.



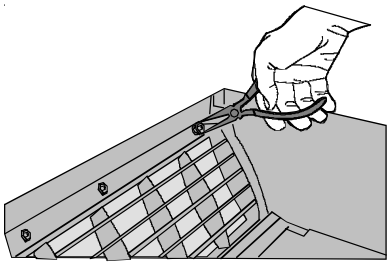
Discharge Grille Orientation Options

Use the following procedure to change the angle of the discharge air flow:

1. Remove the front cabinet (see Front Removal).
2. Position the front so that the backside is accessible.



3. Remove the four nuts which secure the discharge air grille to the cabinet front.



4. Rotate the grille 180° end-for-end.
5. Reinstall the nuts securing the discharge air grille to the cabinet front. Reinstall the cabinet front on the unit.

PROPER INSTALLATION

CONFIGURATION SETTINGS FOR G & K BOARDS

The control can be configured to operate a wide range of options. The options listed below with the * are the factory default settings. If these are acceptable, then the unit does not require any additional configuration and is fully operable. To configure the unit, first select the configuration feature code setting and then an option code to change from the factory default setting.

To **enter configuration feature mode**:

1. **Press** and **continue to hold** the up and down  arrow keys and quickly **press** the **OFF**  key **twice within a two (2) second time frame**. The display will alternate between displaying the feature code **C1** and the option code **0** (factory default setting)**.** The lower right dot on the display will flash. To enter the other option codes for C1 (**rE and L5)** press either the up or down arrow key.
2. To select a configuration **feature code** other than C1, press the **HEAT**  key until the desired configuration comes up. To scroll to a previously viewed configuration codes press the **COOL**  key.

   Once you have scrolled to the correct feature, then to select the **option code** for your desired configuration, press either the up or down key  to scroll through the options of the selected feature code.

To **exit configuration mode**:

Press the **OFF**  key. Configuration feature mode will also exit **if no keys are pressed** for a period of **two (2) minutes**.

Below are the most common configuration settings. Additional codes are present and may be accessed within this menu. Contact the manufacturer for additional information.

PROPER INSTALLATION

Feature Code	Description	Option Code	Description
C1	Interface Usage	0*	Unit is only controlled by the touchpad behind the door.
		rE	Unit is both controlled by a wireless thermostat and/or the touchpad behind the door.
		L5	Unit is controlled by a wired thermostat only via on the low voltage terminals.
C2	Fan Operation	Au*	The fan only runs with the call for heating or cooling.
		On	The fan runs continuously except in the OFF position.
C4	Room Indentification first two digits (00 to 99)	00-99	Set first two digits of room identification
C5	Room Identification last two digits (00 to 99)	00-99	Set last two digits of room identification
C6	Occupancy	0*	"No Occupancy" detection devices
		1	Wired Door Switch and Motion Sensor present
		18	Enter "No Occupancy" routine 18 hours after last control selection
C7	Motion Sensor Type	1	Normally Closed Device
		0*	Normally Open Device
C8	Cooling Temperature Limiting	60-72 (65*)	Select temperature between 60 and 72 for minimum cooling set point
C9	Heating Temperature Limiting	74-90 (80*)	Select temperature between 74 and 90 for maximum heating set point
C0	Reverse Cycle "B" or "O" selection for thermostat	8*	Mating thermostat has a "B" terminal
		0	Mating thermostat has an "O" terminal
c1			*Not used*
c2	Wired Unrented Set Back	0*	Not Active
		A	Active
c3	Unrented Cooling Temperature	60-90 (79*)	Select temperature between 60 and 90 unrented cooling set point.
c4	Unrented Heating Temperature	60-90 (63*)	Select temperature between 60 and 90 unrented heating set point.
CA	Twinned Unit	0*	Not Twinned
		5	Twinned (Slave)
Cb	Dehumidification	0*	Not Active
		1	Active
		U	Active in No occupancy / Unrented State
CC	Dehumidistat call for a drop in temperature	3-8	3-8
Cd	English/Metric Temperature	F*	Fahrenheit Scale
		C	Celsius Scale
CE	Freeze Protection	1*	On
		0	Off

* Indicates factory default.

MAINTENANCE

NOTE: The compressor does not require maintenance. It is hermetically sealed, permanently lubricated.

⚠ WARNING

TO PREVENT PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK, DISCONNECT THE ELECTRICAL POWER SUPPLY BEFORE CLEANING THIS UNIT.

⚠ WARNING

TO AVOID THE RISK OF PROPERTY DAMAGE, ELECTRICAL SHOCK OR PERSONAL INJURY, CLEAN AIR FILTERS AND COILS REGULARLY. CLOGGED OR SEVERELY RESTRICTED FILTERS OR COILS REDUCE AIRFLOW WHICH CAN CAUSE DRASTIC EFFICIENCY LOSS AS WELL AS SEVERE COMPONENT DAMAGE TO COMPRESSORS, ELECTRICAL HEATER OR FAN MOTOR. IN EXTREME CASES, CLOGGED FILTERS AND/OR COILS MAY CREATE A FIRE HAZARD AND WILL VOID THE WARRANTY.

⚠ WARNING

SOME LOCAL CONDITIONS AND ENVIRONMENTS CAN CAUSE FUNGI AND OTHER MATERIAL TO GROW INSIDE THE PTAC UNIT. THIS MATERIAL WHEN DRIED, AS WELL AS OTHER FOREIGN MATERIAL, SIMILAR TO DRYER LINT IN YOUR CLOTHES DRYER, ARE FIRE HAZARDS. BE SURE TO THOROUGHLY CHECK AND CLEAN THE UNIT'S COILS, BLOWER WHEEL AND BASEPAN PER THE INSTRUCTIONS CONTAINED IN THIS MANUAL.

MONTHLY MAINTENANCE AND CLEANING

Intake Air Filter

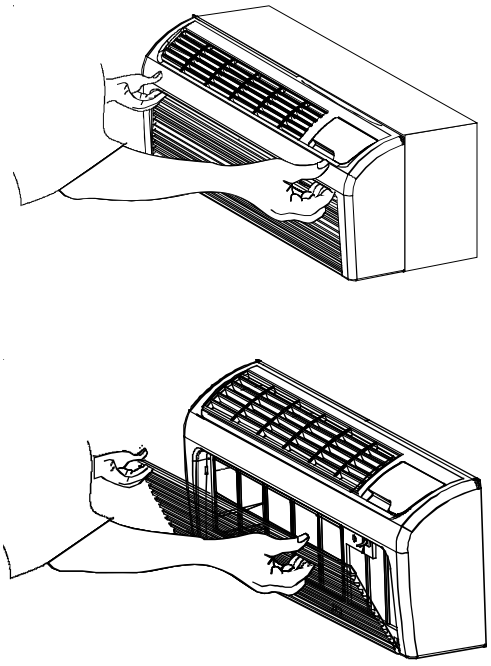
To properly maintain the operational performance of your PTAC unit, it is **extremely** important that the inlet air filter be cleaned once per month or more often if operated in dusty or dirty locations or conditions. The intake air filter is constructed of durable polypropylene. The “air intake” air filter can be easily inserted into the cabinet front using the cabinet filter guides. The intake air grille swings out for easy access to the filter. Before cleaning the intake filter, turn the unit off by setting the mode switch to the OFF position. Filter should be cleaned as required.

The following procedure is used to remove the intake filter:

1. Open the intake grille by grasping the top intake louver.
2. Pull the intake grille open.
3. Slide filter upward and remove.
4. Clean filter with vacuum or with running water.

Reverse this procedure to reinstall the filter.

NOTE: Available accessory filter kits are FK10B (air intake filter - 10 per pack) and CFK10B (charcoal filter - 10 per pack). The charcoal filters will greatly improve the quality of the air by absorbing odors from tobacco smoke, mold, mildew, etc. Both filters are permanent and cleanable. Contact your sales person for details.



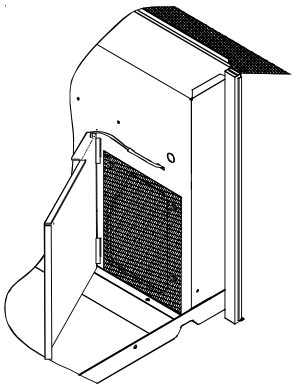
Intake Filter Removal

Vent Screen

Before cleaning the vent screen, disconnect power to the unit by unplugging the power cord at the wall outlet or subbase, or disconnect power at the fuse box or circuit breaker. **If unit is operated with vent door closed**, the vent screen does not need to be cleaned.

1. Remove the cabinet front as described in Front Removal.
2. Remove the six screws securing the chassis to the wall sleeve.
3. Slide the chassis out of the wall sleeve far enough so that the vent screen is accessible.
4. Remove the three screws securing the vent mesh screen to the partition panel.
5. Clean and replace the vent screen, slide the chassis back into the wall sleeve, secure it in place with six screws and reinstall the front cabinet.

MAINTENANCE



Vent - (Left Side Unit)

Cabinet Front

The cabinet front and discharge air grille can be cleaned with a water dampened cloth . Under no circumstances should hydrocarbon-based cleaners (e.g. acetone, benzene, naphtha gasoline, etc.) be used to clean the front or air grilles. Use care when cleaning the control area**.**

YEARLY MAINTENANCE AND CLEANING

NOTE: Use a mild **biodegradable** detergent such as Simple Green**™** when cleaning the unit.

Special care must be taken to protect the unit's control board and other electrical components from getting any water on them while cleaning. The use of harsh or caustic cleaning agents or materials such as bleach or coil cleaners that are not designed for PTAC products will cause damage or deterioration of the aluminum fin or coil material and is not recommended. Care must be taken not to bend the aluminum fin stock.

Routine Scheduled Maintenance

To achieve continuing top performance and high efficiency, establish a "once a year" cleaning/inspection schedule for the unit. Take the unit out of the sleeve and thoroughly clean and rinse. Be sure to include in the yearly cleaning the evaporator coils, and condenser coils, basepan, and drain passages. Scheduled maintenance can be accomplished by either local maintenance staff or by an authorized servicer. They must follow the instructions described in this manual.

Adverse Operating Conditions Maintenance

Units operating in dusty or corrosive locations; i.e. dusty construction site or sea coast, must be cleaned more often. A minimum of four (4) times a year will maintain proper operational conditions and protect unit components.

Wall Sleeve

Clean the wall sleeve while cleaning the unit. The caulking around the sleeve should be checked to make sure that any potential air and water openings around the sleeve are properly sealed. The wall sleeve's level should also be rechecked. Proper leveling for most installations are a ¼ bubble tilt to the outside and level from right to left. Contact your sales person for detailed maintenance or cleaning instructions.

Basepan and Condenser Coil

⚠ WARNING

DO NOT USE COMMERCIAL GRADE COIL CLEANERS. SOME OF THESE CLEANERS MAY CONTAIN ETHYLENE DIAMINE TETRACETIC AICD (EDTA) WHICH CAN SHORTEN THE LIFE OF THE CONDENSER COIL.

Before cleaning the basepan and condenser coil, turn OFF unit mode switch and disconnect power to the unit. To disconnect power, either unplug the power cord at the wall outlet or subbase, or disconnect power at the fuse box or circuit breaker.

1. Create a water-tight seal by tightly covering the entire control panel area and fan motor with plastic. Creating this seal prevents water from entering the control area or the fan motor and damaging the unit.
2. Spray condenser coil and basepan down with water. Next spray a mild **biodegradable** detergent such as Simple Green**™** onto the condenser coil and basepan. Let set for five (5) minutes.
3. Rinse condenser coil and basepan with water again. **NOTE:** Ensure water pressure is no higher than that of an ordinary garden hose and the water temperature no higher than 120°F.
4. Tilt the non-compressor side of the unit up no higher than 45 degrees and allow water to drain out the other side of the unit.
5. Remove excess water left in the basepan by wiping the basepan with a dry cloth.
6. Remove the water-tight seal from the motor and control panel area.
7. Reinstall unit back into wall sleeve.
8. Allow unit to dry for 24 hours before reapplying power. When power is reapplied test unit for proper operation.
9. Place a non-acidic algaecide in the basepan to inhibit bacteria growth. Ensure the algaecide is compatible with wet coil operation and is not corrosive to the coil.

MAINTENANCE

⚠ WARNING

HIGH PRESSURE AND HIGH TEMPERATURE CLEANING IS NOT RECOMMENDED. DOING SO COULD DAMAGE THE ALUMINUM FIN STOCK AND ELECTRICAL COMPONENTS.

CLEARANCE CHECK

Clearances around the unit should also be checked to make sure that the intake air and discharge air paths have not become blocked or restricted. A minimum of eight inches clearance is needed from unit to furniture, beds, or other objects for proper operation. Restricted discharge or intake air will reduce the units operational performance. In severe airflow restrictions damage can occur to unit components such as the compressor, electric heater or fan motor.

NORMAL OPERATING SOUNDS AND CONDITIONS

Water Trickling Sounds

Water is picked up and distributed over the coil. This improves the efficiency and helps with water removal.

Water Dripping

Water will collect in the base pan during high humidity days. This can cause overflow and drip from the outside of the unit.

Air Sounds

The fan cycle switch sets the operational mode of the fan in the on position. When the unit is in conditioning mode for example high or low heat or cool, the fan will run continuously. In the AUTO position , the fan will cycle on and off with the compressor or electric heater.

Starting Delay

You may notice a few minutes delay in the starting if you try to start the unit too soon after turning the unit off. This is due to a built in delay to protect the compressor.

OPERATIONS
SEQUENCE OF OPERATION

Cooling Mode

Set the thermostat to the desired temperature then set the mode switch to high or low cool. The fan motor will start first then the compressor will start approximately 10 seconds later. When the room temperature has reached the desired temperature the compressor will shut off and the fan will continue to run for 30 seconds then shut off. If the fan cycle switch has been set to "ON" or the electronic board has been programmed for "ON" the fan will continue to run.

Heating Mode

Set the thermostat to the desired temperature then set the mode switch to high or low heat. The fan motor will start, the reversing valve will engage and then the compressor or electric heat strip will start. If the unit is a heat pump the temperature of the room and the set point of the thermostat will determine if the unit brings on the compressor or electric heat. The room temperature will need to be within 4 degree's of the thermostat set point on "C-K" models and 2 1/2 degree's on "A-B" models for the compressor to come on in the heat pump mode. Any time the temperature of the room is more then 4 degree's or 2 1/2 degree's colder than the set point the electric heat will be energized. The outdoor coil thermostat or thermistor will lock out the compressor when the outdoor coil reaches a certain temperature. Clamp on bi-metal thermostat disc's may be on "A-B" model units. The bi-metal thermostats will open when the coil temperature reaches 25º ± 5º and closes at 50º. The plug in thermistors on the "C-K" models will lock the compressor out at 24º outdoor temperature and allow heat pump operation to come back on at 33º.

CONTROL BOARD CHARACTERISTICS

- **Automatic 3-minute Compressor Lockout -** After the compressor cycles off, it will not restart for three minutes. This feature is enabled in standard or remote thermostat control.

NOTE: This delay may be defeated by shorting the “FD1” and “FD2” terminals together for a minimum of 5 seconds

- **Compressor lock-in feature-** Whenever the compressor is switched from off to on because the room temperature has risen above or fallen below the specified limit it will remain on for at least four minutes. However , if the thermostat point is changed during the four minutes this lock in feature is overridden.
- **Automatic 2nd Stage Electric Heat (Heat Pump Models)-** If the room temperature falls to 4°F below the set point temperature, the reverse cycle heat pump is shut off and the strip heat is turned on.
- **Automatic Freeze Protection -** Whenever power is supplied to the unit and the master switch is in the ON position, automatic freeze protection is active. If the thermistor senses temperature below 40°F+/-5°F, the fan motor and electric strip heat (or hydronic heat, if applicable) are switched on. The heater and fan will remain on until the Thermistor senses a temperature of 43°F.
- **Fan Advance/ Delay-** The advance feature will allow the fan to start six seconds prior to the compressor starting in either cooling or heating mode. The delay will keep the fan running for thirty seconds after the compressor stops in either cooling or heating modes.
- **Remote Thermostats -** Always use an approved thermostat supplied by the manufacturer. A wall thermostat that has not been approved by the manufacturer may not work correctly with this unit.
- **Remote Functions -** All functions are controlled by a wall mounted thermostat.
- **Remote Fan-** When GL terminal is connected to R terminal the remote fan speed is switched to low. GH terminal connected to the R terminal fan speed is switched to high.
- **Fuse Protection-** The fuse protection has been maximized on the 24 volt circuit so accidental groundings of the external terminals will not result in a burned out board. The unit may be operated in standard mode if the fuse is blown. There will be an auxiliary fuse supplied with the board. It will be attached to the main fuse by a plastic clip. The fuse is a 500 ma fuse. When replacing the fuse always use the correct fuse part #M0804205.
- **Random Delay -** When the master switch is turned on or power is reapplied to the control, all functionality will be locked out for a random period between two and four minutes, if Y or W inputs are active in remote or the mode switch is set to HI/LO heat or cool. The delay can be avoided if the front desk terminals are closed for more than two seconds, or the mode switch is in the off or fan only position.
- **Transformer Selection-** Some boards come with the transformer selection set for on-board use, if an external transformer is utilized move the jumper from "ON-BOARD to EXTERNAL". If applicable, the wiring for an external transformer connects to the "EXT XFRMR" terminals.
- **Indoor Ambient Thermistor-** The Indoor Ambient Thermistor senses actual room temperature.
- **Indoor/Outdoor Coil Thermistors-** In the cooling mode, if the compressor is engaged continuously for 20 minutes and the Indoor Coil Thermistor is below 30 degrees the compressor is disengaged until the ICT rises above 45 degrees. The Outdoor Coil Thermistor senses coil temperature which correlates to outdoor air temperature. Heat pump operation can operate as low as 24°F outdoor temperature depending upon humidity conditions and/or the balance point of the system. After defrost is initiated, the compressor remains off for at least thirty minutes and resumes operation when the outdoor coil temperature reaches 33°F. Electric resistance heat will maintain the ambient room temperature anytime the temperature falls 4°F below the room set point temperature.
- **Load Shedding-**The LS & IN terminals are used for load shedding. A switch can be added to close the circuit to lock out the compressor and electric heat when the power company or energy management system is trying to reduce its load for a specified time.

OPERATIONS

- **Sample Before Start -** The SBS routine is used in the cooling mode. This routine runs the unit fan on low speed for up to 120 seconds. The sample fan is aborted if compressor demand is detected. To avoid unnecessary sampling the period between samples will be based on specific room conditions. The default sample before start period after a power up is 5 minutes. The period is corrected every time a sample run is completed without a compressor demand. The minimum sample period is 5 minutes and the maximum period is 15 minutes.
- **Remote Temperature Sensor -** An auxiliary temperature sensor (RTS02) may be connected to the control that senses actual room temperature. This sensor replaces the Indoor Ambient Thermistor and will connect to the Indoor Air terminals on the control.
- **Front Desk Control -** The front desk control terminals are FD1 and FD2. These terminals will provide a connection for a user supplied switch that will allow the operation of the unit to be remotely defeated.
- **Transfer Fan-** A transfer fan may be used if a user supplied relay is connected to TF1 and TF2. Make sure the relay is a manufactured approved relay. The relay will be energized whenever the blower/fan relay is energized.
- **Emergency Hydronic Heat -** A switch can be added to the EH & IN terminals to close the circuit to enable the fan, enable the heater relay and lockout the compressor to continue minimum operations with auxiliary power, if the main power goes out.
- **On Board Diagnostics -**The LED light will flash once every 6 seconds. If an error occurs the LED will flash from 2 to 8 flashes every 6 seconds. Refer to the chart below for possible causes for the flash codes. See page 29 for diagnostics on the digital board.shes Situation Corrective Action

FLASHES	SITUATION	CORRECTIVE ACTION
1 Flashes	Control OK	Board OK
2 Flashes	24vac Fuse Blown	Replace Fuse
3 Flashes	Indoor Coil Thermister Failure	Replace Indoor Coil Thermister
4 Flashes	Mode Switch Failure	Replace Board
5 Flashes	Thermostat Control	Replace Board
6 Flashes	Thermostat Input Failure	Replace Thermostat or Correct Wiring
8 Flashes	Indoor Ambient Thermister Failure	Replace Thermister

- **Temperature Limiter Switch-** A three position dip switch will modify the temperature desired setting by activating the appropriate switch. Only one switch may be activated at a time.

SWITCHES	COOLING RANGE		HEATING RANGE	
"A" On	70	78	65	73
"B" On	68	81	68	76
"C" On	66	81	61	78
"D" All Off (Default)	63	88	58	83

- **Self diagnostic Mode-**The diagnostic mode is initiated by the following routine. Set the thermostat in the coolest position and the mode switch in the off position. Rotate the thermostat counterclockwise to the warmest setting and rotate the mode switch counterclockwise to the fan only position simultaneously and wait two seconds (or until fan relay engages). Return the thermostat and mode switch to their starting positions by rotating them both clockwise simultaneously. The diagnostic routine will run the unit through each mode in the following sequence:

MODE	TIME
Fan Only	5
Off	1
High Cool	17
Off	3 (reversing valve energize)
High Heat (rev cycle)	17
Off	1
Low Heat (elec heat)	5

DIGITAL BOARD DIAGNOSTICS

If a failure is detected on the digital board, there will be a green light constantly lit up. This light is located under the OFF touch pad button. The board will need to be programed into the Diagnostic Maintenance & Status Report mode to determine the failure and the procedures to correct the failure.

DIAGNOSTIC MAINTENANCE & STATUS REPORT

To enter **Diagnostic Status Report mode, press and hold the up and down arrows and, while holding, quickly press the COOL key twice.**

Active Failures.

- If there are no active failures or lockouts, the display will show a double dash, "- -". If there is a code listed, see the unit "Diagnostic Codes" chart for a list of definitions.

Operating Temperatures.

- If not in Diagnostic Status Report Mode, enter as instructed above and press the Fan Speed key.
- If already in Diagnostic Status Report mode, press the Fan Speed key. The display will show the temperature of the desired set point, **SP**; the temperature at the wireless thermostat, **rL**; the indoor ambient temperature behind the filter, **IA**; the indoor coil temperature, **IC**;

the indoor discharge air temperature, **Id**; the outdoor coil temperature, **OC**; the outdoor ambient temperature, **OA**; and the spare probe temperature, **IH**. If any of the probes are not populated the display will show the corresponding failure code.

Past Failure Log

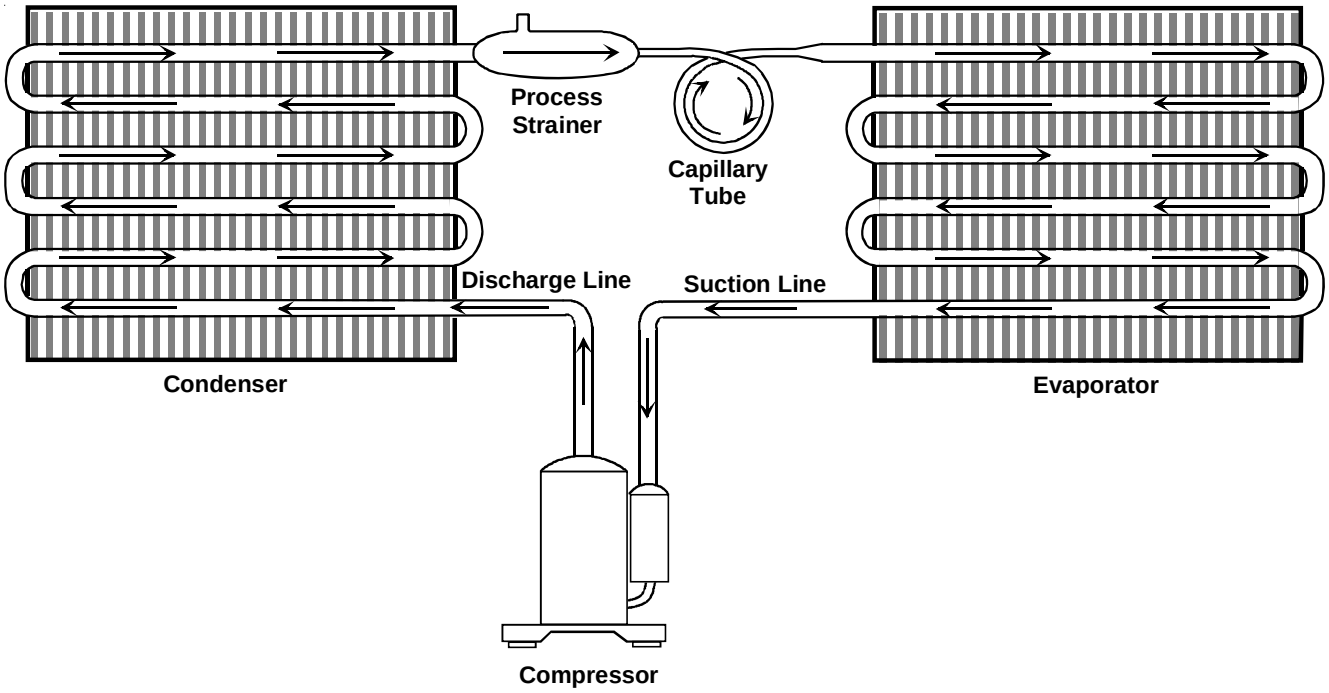
- If not in Diagnostic Status Report Mode, enter as instructed above and press the Fan Speed (FAN &SPEED) key twice.
- If already in Diagnostic Status Report mode, press the Fan Speed (FAN &SPEED) key. While the display is showing operating temperatures, the last 10 failure codes active or past can be requested by pressing the Fan Speed (FAN &SPEED) key again. The codes are displayed last entry first followed subsequently by each preceding code.

Note that modes F1 and Fd are also displayed in the normal control operation (see “Diagnostic Codes” chart).

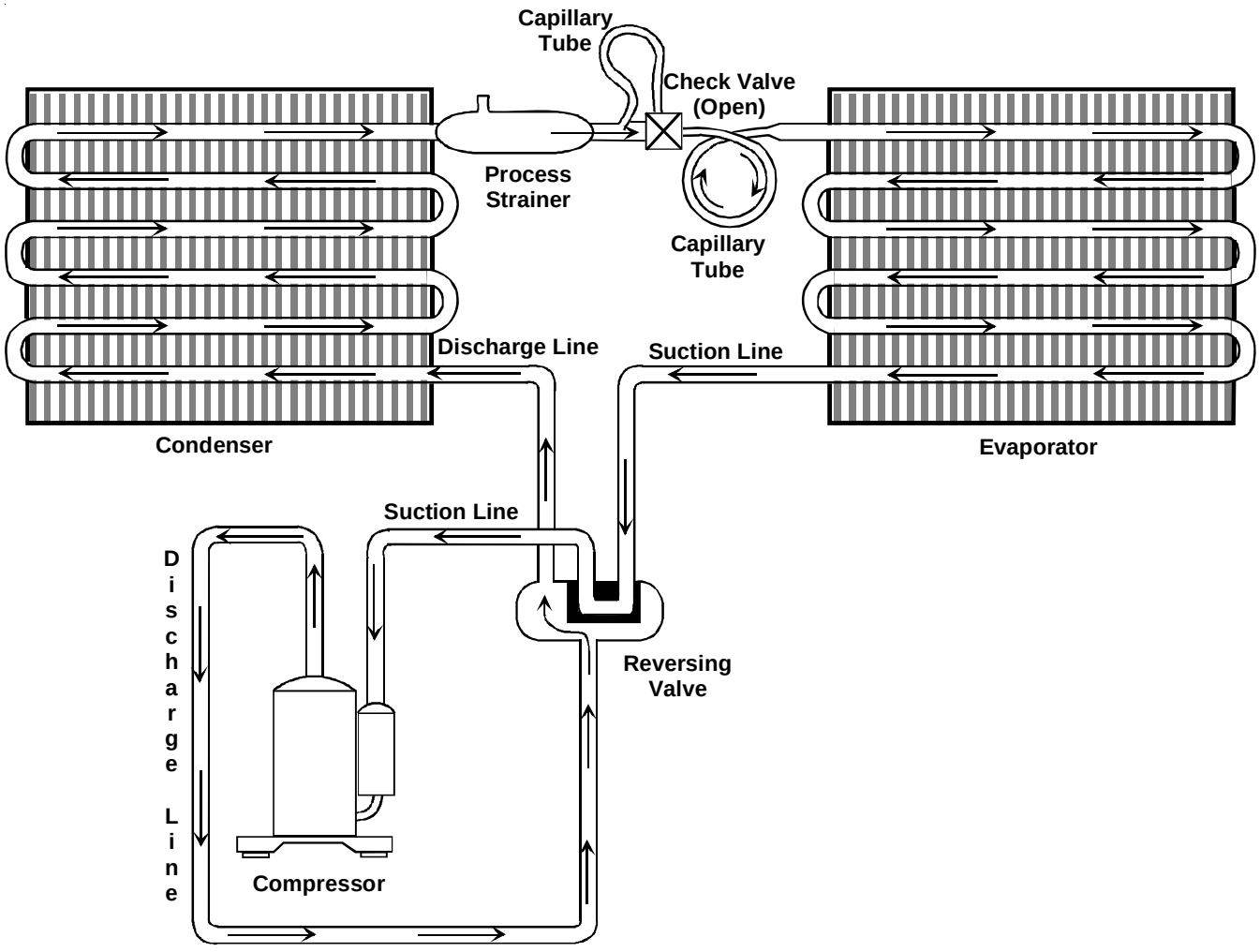
To exit **Diagnostic Status Report mode, press** the OFF (OFF) key.

DIAGNOSTIC CODES

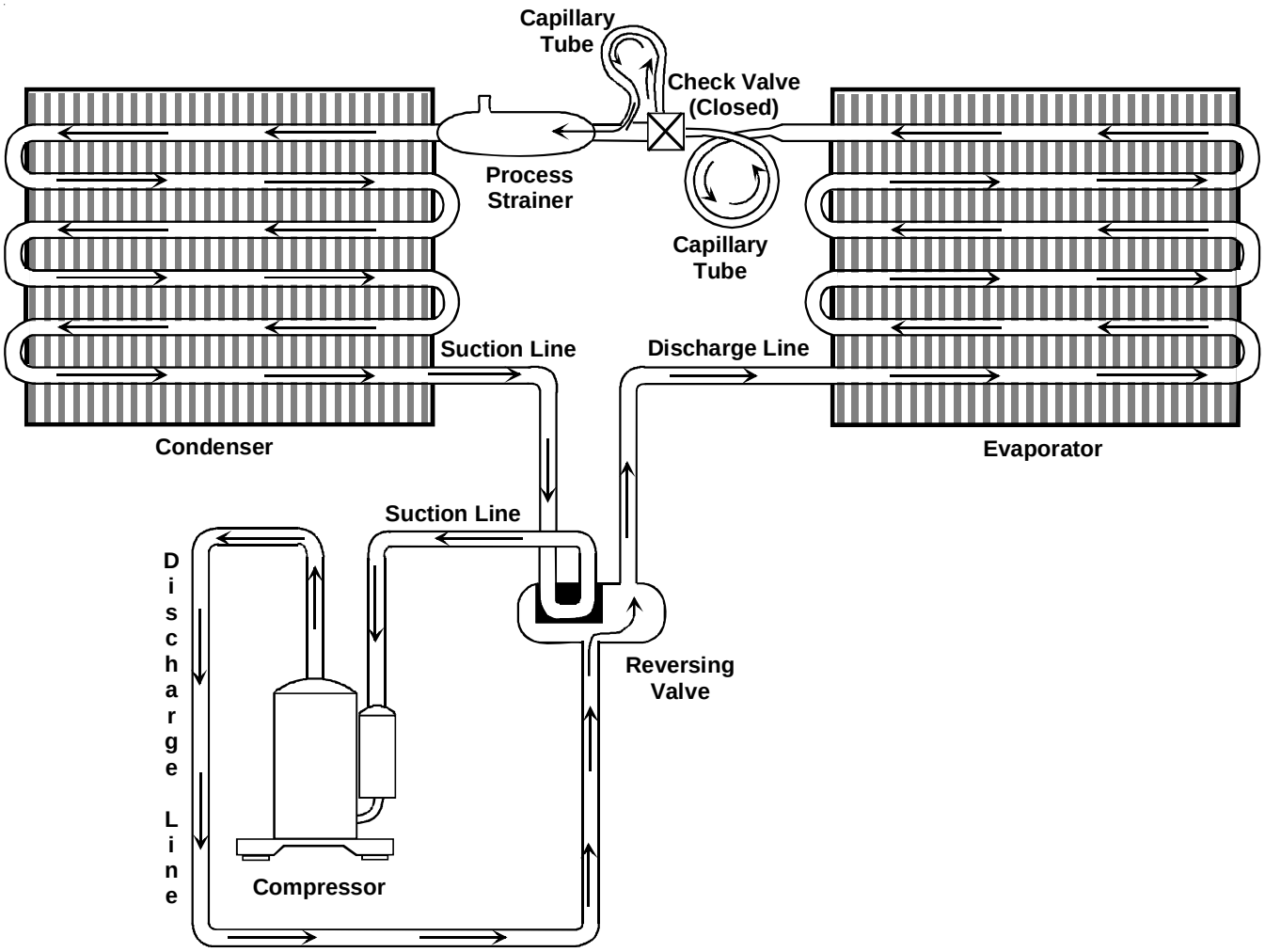
CODE		STATUS	DISPLAY	ERROR LIGHT	SUGGESTED ACTION
MODES	FP	**Freeze Protection** Engaged. The room temperature measured by the wireless remote thermostat or indoor ambient thermistor active sensor falls below 40°F.	Y	N	No Action required. This setting will disengage when the room temperature rises above 43°F.
	Fd	**Front Desk** switch is closed. All outputs are switched off.	Y	N	Open front desk switch to allow occupant unit operation.
	Fb	Low Remote Battery Warning.	N	Y	Replace Battery in Wireless Devices.
FAILURES	F1	Indoor Ambient Thermistor reads outside the range -20°F to 200°F **&** the wireless thermostat is not communicating to the unit control or Indoor Ambient Thermistor (IAT) without a wireless remote thermostat reads outside the range -20°F to 200°F.	Y	Y	Replace black Indoor Ambient Thermistor or Wireless Remote Thermostat.
	F4	Indoor Coil Thermistor either above or below operating tolerances.	N	Y	Replace Red Indoor Coil Thremistor .
	F5	Wireless Thermostat failure.	N	Y	Replace Wireless Thermostat.
	F6	Indoor Discharge Thermistor either above or below operating tolerances.	N	Y	Replace Yellow Indoor Discharge Thermistor.
AIRFLOW WARNINGS	L6	Discharge Air Too Hot..	N	Y	Clean Filter or Remove Air Blockage.
	L8	Air Restriction in Heating.	N	Y	Clean Filter or Evaporator Coil.
	L9	Air Restriction in Cooling.	N	Y	Clean Filter or Evaporator Coil.
	LC	Outdoor Coil Thermistor temperature high.	N	Y	Clean Condensor Coils, Check Fan fault code. Code will reset after cleaning.
	C1	Clean Indoor Coil / Filter.	N	Y	Check for Blocked Indoor Air.
	C0	Clean Outdoor Coil.	N	Y	Check for Blocked Outdoor Air.



Refrigeration Sealed System - Air Conditioner



Refrigeration Sealed System - Heat Pump (Air Conditioning Mode)



Refrigeration Sealed System - Heat Pump (Heat Pump Mode)

SERVICING
REFRIGERATION SYSTEM SERVICE

⚠ WARNING
HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

⚠ WARNING

BRAZING REQUIRES HIGH TEMPERATURES. TAKE PRECAUTION TO PROTECT AGAINST PERSONAL INJURY OR PROPERTY DAMAGE. TO AVOID THE RISK OF FIRE, THE REFRIGERATION SYSTEM MUST BE KEPT FREE FROM CONTAMINATION DUE TO THE PRESENCE OF AIR. FOLLOW THESE INSTRUCTIONS EXACTLY. TO AVOID THE RISK OF BURNS, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH, DO NOT PLUG IN THIS PRODUCT OR APPLY POWER TO THE COMPRESSOR IF THE COMPRESSOR TERMINAL COVER HAS BEEN REMOVED OR IS NOT FIRMLY IN PLACE.

IMPORTANT NOTE: Effective July 1,1992 before opening any refrigerant system it is the responsibility of the service technician to capture the refrigerant for safe disposal.

Refer to the cooling and heater performance charts in this section for capacity test procedure.

A step-by-step procedure for determining source of trouble, suggested method and normal values are provided in the Diagnosis Charts.

Service operations requiring opening of the hermetically sealed refrigeration system should not be performed in the home. The unit must be taken to a well equipped shop where special equipment for evacuating, dehydrating, charging and testing is available. The following equipment is necessary.

Equipment to use dry nitrogen of no more than .0012 grains of moisture. Vacuum pump capable of evacuating to a minimum of 50 microns.

Vacuum Pump - Kenney or equivalent. Micron gauge to check vacuum. Refrigerant charging cylinder accurate to within 1/4 oz. Electronic leak detector - General Electric or equivalent. Electrical equipment to test: compressors, capacitors, voltage relays and overload protectors Electrical test board or portable equipment, including: volt meter, ammeter, and watt meter. Silver soldering and brazing equipment: Pinch off tools 1/4" to 5/8" Thermocouple tester.

Dehydrating And Evacuating Refrigeration System

A rather popular misconception exists that since air conditioners normally operate with a refrigerant temperature above 32°F., moisture in the system is harmless. Nothing could be further from the truth. Oxygen from moisture plus normal compressor and motor heat reacts chemically with the refrigerant and oil to form corrosive hydrochloric and hydrofluoric acids. These acids contribute to the breakdown of motor winding insulation and the corrosion of compressor working parts and cause unnecessary compressor failure. Sludge, which is a residue of the chemical action, coats all compressor parts, the inside of refrigerant tubing, and may even restrict refrigerant flow through the capillary tube(s).

Leak Testing

Refrigerant leaks are best detected with a halide or electronic leak detector.

The importance of careful leak testing cannot be overemphasized. Undetected leaks invariably lead to repeated calls and eventually result in system contamination, restrictions and burned out compressors.

For a system that contains a refrigerant charge and is suspected of having a leak, stop the operation, check all tubing and fittings. Soap suds may also be used.

NOTE: The flame of the halide detector will glow green in the presence of R22 refrigerant.

If a leak is detected, do not attempt to apply more brazing material to the joint. Recover the charge, unbraze the joint, clean and rebraze.

For a system that has been newly repaired and does not contain a charge, connect a cylinder of refrigerant, through a gauge manifold, to the process tube of the compressor and liquid line strainer. Open the valve on the cylinder and manifold and allow the pressure to build up within the system. Check for and handle leaks as described above.

After the test has been completed, recover the test charge, evacuate the system, and recharge with clean refrigerant.

Brazing

Satisfactory results require cleanliness, experience and the use of proper material and equipment.

The connections to be brazed must be properly sized, free of rough edges and clean.

The generally accepted materials are:

SIL-FOS (Alloy of 15% silver, 80% copper, 5% phosphorus) is used without flux on copper to copper. **DO NOT USE FOR A COPPER TO STEEL CONNECTION.** Recommended heat is approximately 1400°F.

SILVER SOLDER (Alloy of 30% silver, 38% copper, 32% zinc.) is used with fluoride base flux on copper to steel, brass to copper, steel to steel, brass to steel. Recommended heat is approximately 1200°F.

Evacuation

⚠ WARNING

TO PREVENT SEVERE BURNS. DO NOT ALLOW THE SLUDGE OR OIL TO CONTACT THE SKIN.

SERVICING

IMPORTANT NOTE: Effective July 1,1992. Before opening any refrigerant system it is the responsibility of the service technician to capture the refrigerant for safe disposal.

This is the most important part of the entire service procedure. The life and efficiency of the equipment is dependent upon the thoroughness exercised by the serviceman when evacuating air (non-condensables) and moisture from the system.

Air in the system causes high condensing temperature and pressure, resulting in increased power input and reduced performance.

Moisture chemically reacts with the refrigerant and oil to form corrosive hydrofluoric and hydrochloric acids. These attack motor windings and parts, causing breakdown.

The equipment required to thoroughly evacuate the system is a high vacuum pump, capable of producing a vacuum equivalent to 50 microns, and a thermocouple vacuum gauge to give a true reading of the vacuum in the system.

NOTE: Never use the system compressor as a vacuum pump or run when under a high vacuum. Motor damage could occur.

1. Connect the vacuum pump, vacuum tight manifold set with high vacuum hoses, thermocouple vacuum gauge and charging cylinder.
2. Connect the low side line to the process tube of the compressor.
3. Connect the high side line to the process tube of liquid line strainer.

NOTE: If either process tube is not long enough to receive the compression or flare fitting and still leave room for a pinch-off, swag the tube and braze in an extra length of tubing.

4. Start the vacuum pump and open shut off valve to the high vacuum gauge manifold only. After the compound gauge (low side) has dropped to approximately 29 inches of vacuum open the valve to the vacuum thermocouple gauge. See that the vacuum pump will bank-off to a minimum of 50 microns. A high vacuum pump can only produce a good vacuum if its oil is not contaminated.
5. If the vacuum pump is working properly, close the valve to the vacuum thermocouple gauge and open the high and low side valves or the high vacuum manifold set. With the valve on the charging cylinder closed, open the manifold valve to the cylinder.
6. Evacuate the system to at least 29 inches gauge before opening valve to thermocouple vacuum gauge.
7. Continue to evacuate to a minimum of 250 microns. Close valve pump and watch rate of rise. If vacuum does not rise above 1500 microns in three minutes, system can be considered properly evacuated.
8. If thermocouple vacuum gauge continues to rise and levels off at about 5000 microns, moisture and non-condensables are still present. If gauge continues to rise a leak is present. Repair and re-evacuate.
9. Close valve to thermocouple vacuum gauge and vacuum pump. Shut off pump and prepare to charge.

Charging

Charge the system with the exact amount of refrigerant.

Refer to the unit nameplate for the correct refrigerant charge. An inaccurately charged system will cause future problems.

1. When using an ambient compensated calibrated charging cylinder, allow liquid refrigerant only to enter the high side.
2. After the system will take all it will take, close the valve on the high side of the manifold.
3. Start the system and charge the balance of the refrigerant though the low side. Do not charge in a liquid form.
4. Close the low side valve on the manifold and pinch-off both process tubes. Remove the manifold set, crimp shut the open ends of the process tubes and braze.
5. Recheck for refrigerant leaks.

NOTE: Do not use a refrigerant other than that shown on the serial number identification plate.

All precautionary measures recommended by the refrigerant manufacturers and suppliers should be observed.

Line Piercing Valves

Line piercing valves may be used for diagnosis but are not suitable for evacuating or charging due to the minute holes pierced in the tubing.

Line piercing valves must not be left on the refrigerant system. The connection between the valve and the refrigerant tubing is not hermetically sealed and will eventually leak.

Open Lines

During any processing of the refrigeration system the lines should never be left open to atmosphere since water vapor will enter and add to the problem of proper evacuation.

Operating Test

The final step in a successful repair is an accurate operating test. Follow the Cooling and Heating Performance tests provided to make sure the product is again performing to design standards.

⚠ WARNING

NEVER TEST OPERATION WITHOUT THE UNIT IN THE WALL SLEEVE. A SERIOUS CHANGE IN DESIGN SPECIFICATIONS FOR AIR MOVEMENT THROUGH THE EVAPORATOR AND CONDENSER COMPARTMENTS, CAUSING THE FAN MOTOR TO OVER HEAT AND THE REFRIGERATION SYSTEM TO BECOME UNBALANCED WILL OCCUR WHEN THE UNIT IS NOT INSTALLED IN THE WALL SLEEVE.

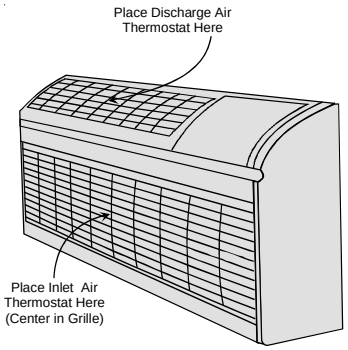
Efficient operation is dependent on a balanced system. One of the most common reasons for inefficiency is the users failure to adequately clean the condenser thereby creating reduced air movement.

SERVICING

Cooling Performance Test Thermometers

The following precautions are necessary in observing the thermometer readings in the cooling performance test.

1. Use two accurately calibrated refrigeration type thermometers or a thermocouple potentiometer.
2. Thermometers are affected by body heat or changes in air flow. Therefore, the thermometers must be secured in proper locations with masking tape, wire or other applicable retainers.
3. Readings should be observed without touching or moving the thermometers.



Sling Psychrometer

The sling psychrometer is used to obtain the wet bulb temperature in determining the percent relative humidity.

To obtain the wet bulb operate the sling psychrometer as follows:

Saturate the wick (only once during procedure of obtaining wet bulb readings) with clean water slightly below room temperature. Psychrometer reading should be acquired five to six feet in front of the unit and approximately four feet off the floor.

NOTE: Direct discharge airflow away from the sling psychrometer.

The cooling performance test should not be employed when outside temperatures are 20° below that of the room. Best results are obtained when the test is conducted under peak load conditions.

The air conditioner must operate at least 20 minutes on the High Cool position before testing.

Cooling Test

The following temperature must be recorded for the cooling performance test:

A. Dry bulb temperature of return air at conditioner. Locate thermometer as illustrated.

B. Dry bulb temperature of air leaving conditioner. Thermometer has to be located as illustrated.

C. The dry bulb thermometer temperature on the sling psychrometer should be plus or minus 1°F within reading obtained on thermometer in the return air. Check wet bulb temperature on sling psychrometer and record same.

D. After the wet bulb temperature, dry bulb temperature, and return air temperature have been recorded, proceed to calculate the temperature difference as follows.

E. Subtract temperature obtained in Step B from temperature obtained in Step A. The remainder temperature is used to calculate from the Cooling Range Chart.

EXAMPLE: Assume a PTH15 unit is under test and the temperature readings indicated below were obtained.

1. Return air D.B. temperature: 80°F, Step A.
2. Discharge air D.B. temperature: 69°F, Step B.
3. Return air, wet and dry bulb temperature as recorded in Step C: Dry Bulb 80°F, Wet Bulb 75°F.
4. In left hand column of Cooling Capacity Charge headed Dry Bulb, find the 80° value.
5. In column headed Wet Bulb find the 75°F value and find the value 8 -13 in the cooling range column under the Model "PTH153 PTH154".

This data shows that the temperature of the air passing through the cooling coil is reduced at least 8°F but not more than 13°F. This example unit is operating normally for the existing conditions.

For the example unit under test, the temperature difference was 11°F (80°F, return air, minimum 69°F discharge air). Since the value is within the listed cooling range 8 - 13, this unit is considered to be operating normally.

For Total Power Input Test (wattage) the following additional readings must be recorded after the unit under test is interconnected with a wattmeter.

- Outdoor dry bulb temperature. Avoid direct exposure of thermometer to sunlight or to hot condenser discharge air.
- Total watts input, measured by wattmeter or calculate by multiplying applied voltage by unit amps.

Calculating Procedure

1. Locate the outdoor temperature obtained in first column of Total Power Consumption Cooling Chart.
2. Locate in second column the return air wet bulb temperature obtained in Step C.
3. The total watts input should come between minimum and maximum values indicated for each model.

EXAMPLE: Assume that a PTH15 is again under test. Proceed as follows and observe test readings as simultaneously as possible.

1. Outdoor dry bulb temperature reading - 95°F.
2. Check watts input - 1510.
3. Wet bulb temperature as described in Step C - 75°F.

In column headed Outdoor Dry Bulb Temperature of the Power Consumption Chart find the 95°F value. Read to the right from the 95°F value and find the room wet bulb temperature (75°F).

Read to the right front the 75°F W.B. value in the PTH15 column and note the minimum and maximum wattage of 1460 - 1575.

Since the wattage reading (1510) obtained in the test is within the prescribed range, the total power input in watts is considered to be normal.

Electric Heat Test

For the electric heat test, the following readings must be recorded after the unit is interconnected with a wattmeter or by recording the total amp draw to the unit.

NOTE: Cabinet front must be in place during this test.

- Record supply voltage to unit.
- Operate unit in highest heat setting.
- Record wattage recorded on wattmeter or total amp draw to unit.
- Refer to heating watts/amps chart. (Whichever is applicable for voltage rating on the unit being tested.)
- The total watts or amps recorded should fall within the minimum and maximum watts/amps listed on these charts.

EXAMPLE: Assume that a PTH15 230/208V with 3.5 kW electric heater is under test.

1. Supply voltage as recorded - 208volts.
2. Watts recorded -2750W or Amps recorded - 13.5 Amps.
3. Locate the readings listed on the following pages. You will note that these readings fall within the voltage, watts and amp draw minimum and maximum ranges listed and therefore the unit heating performance would be considered normal.

Heating Power Consumption Test (Heat Pump Mode Only)

For the total power consumption test, the following readings must be recorded after the unit is interconnected with a wattmeter.

- Outside coil inlet air dry bulb temperature.
- Inside coil inlet air dry bulb temperature.
- Total watts input measured by wattmeter.

Calculating procedure

1. Locate temperature obtained in Step A in first column of Heating Wattage Chart.
2. Locate in second column the inside coil inlet D.B. temperature.
3. The total watts input should come between minimum and maximum values indicated for each model.

EXAMPLE: Assume that a PTH15 is under test.

Proceed as follows and observe test readings as simultaneously as possible.

1. Outside coil inlet D.B. temperature readings as described in Step A: 45°F.
2. Check watts input: 1370 W.
3. Inside coil inlet D.B. temperature reading as described in Step B: 75°F.

Read to the right from the 75°F inside coil inlet D.B. value in the column and note the minimum and maximum wattage of 1335 - 1470.

Since the wattage reading (1370) obtained in the test is within the prescribed range, the total power input in watts is considered to be normal.

See the charts on the following pages.

COOLING WATTAGE - HEAT PUMPS

Model		PTH073	PTH074	PTH093	PTH094	PTH123	PTH124	PTH153	PTH154
Temperature		Total Wattage Input	Total Wattage Input	Total Wattage Input	Total Wattage Input	Total Wattage Input	Total Wattage Input	Total Wattage Input	Total Wattage Input
Outside Coil Dry Bulb (ºF)	Room Wet Bulb (ºF)	Min	Max	Min	Max	Min	Max	Min	Max
100	85	625	698	805	885	1110	1205	1500	1615
	80	630	700	810	890	1115	1210	1520	1635
	75	630	700	810	890	1120	1215	1530	1645
	70	630	700	810	890	1115	1210	1530	1650
	65	625	695	805	885	1110	1205	1525	1645
	60	615	685	795	875	1105	1200	1515	1630
	55	605	675	785	865	1090	1185	1495	1610
95	85	590	660	760	840	1060	1155	1430	1545
	80	595	665	765	845	1065	1160	1445	1565
	75	600	670	770	845	1065	1160	1460	1575
	70	595	665	765	845	1065	1160	1460	1575
	65	590	660	760	840	1060	1155	1455	1570
	60	585	655	755	835	1050	1145	1440	1560
	55	570	645	745	820	1040	1135	1420	1540
90	85	560	630	720	800	1010	1105	1355	1475
	80	565	635	725	805	1015	1110	1375	1490
	75	565	635	725	805	1015	1110	1385	1505
	70	565	635	725	805	1015	1110	1390	1505
	65	560	630	720	800	1010	1105	1385	1500
	60	550	620	710	790	1000	1095	1370	1485
	55	540	610	700	780	990	1085	1350	1465
85	85	525	600	680	755	960	1055	1285	1400
	80	530	600	685	760	965	1060	1305	1420
	75	535	605	685	765	965	1060	1315	1430
	70	530	600	685	760	965	1060	1315	1435
	65	525	600	680	755	960	1055	1310	1430
	60	520	590	670	750	950	1045	1300	1415
	55	510	580	660	735	940	1035	1275	1395
80	85	495	565	635	715	910	1005	1215	1330
	80	500	570	640	720	915	1005	1230	1350
	75	500	570	640	720	915	1010	1240	1360
	70	500	570	640	720	910	1005	1245	1360
	65	495	565	635	715	910	1005	1240	1355
	60	485	555	630	705	900	995	1225	1345
	55	475	545	615	695	890	985	1205	1320

SERVICING

COOLING CHANGE OF TEMPERATURE - AIR CONDITIONERS

Model		PTC073	PTC074	PTC093	PTC094	PTC123	PTC124	PTC153	PTC154
Temperature		Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)
Outside Coil Dry Bulb (°F)	Room Wet Bulb (°F)	Min	Max	Min	Max	Min	Max	Min	Max
90	85	1	3	2	6	1	5	1	4
	80	6	11	10	15	9	13	8	13
	78	15	19	18	23	17	22	16	21
	70	23	28	27	31	25	30	24	29
85	80	3	8	7	11	5	10	5	9
	75	11	16	14	19	13	18	12	17
	70	18	23	22	26	20	25	20	24
	65	26	31	29	34	28	33	27	32
80	75	7	12	10	15	9	13	8	13
	70	14	18	17	21	15	20	15	19
	65	20	25	23	28	22	26	21	26
	60	27	31	30	34	28	33	28	32
75	70	9	14	12	17	10	15	10	15
	65	14	19	17	22	15	20	15	20
	60	19	24	22	27	20	25	20	25
	55	24	29	27	32	25	30	25	30
70	65	9	13	11	15	9	13	9	14
	60	13	17	15	19	13	17	13	18
	55	17	21	19	23	17	21	17	22

COOLING CHANGE OF TEMPERATURE - HEAT PUMPS

Model		PTH073	PTH074	PTH093	PTH094	PTH123	PTH124	PTH153	PTH154
Temperature		Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)	Temperature Across Indoor Coil (ΔT)
Outside Coil Dry Bulb (°F)	Room Wet Bulb (°F)	Min	Max	Min	Max	Min	Max	Min	Max
90	85	1	3	2	6	1	5	1	4
	80	6	11	10	15	9	13	8	13
	78	15	19	18	23	17	22	16	21
	70	23	28	27	31	25	30	24	29
85	80	3	8	7	11	5	10	5	9
	75	11	16	14	19	13	18	12	17
	70	18	23	22	26	20	25	20	24
	65	26	31	29	34	28	33	27	32
80	75	7	12	10	15	9	13	8	13
	70	14	18	17	21	15	20	15	19
	65	20	25	23	28	22	26	21	26
	60	27	31	30	34	28	33	28	32
75	70	9	14	12	17	10	15	10	15
	65	14	19	17	22	15	20	15	20
	60	19	24	22	27	20	25	20	25
	55	24	29	27	32	25	30	25	30
70	65	9	13	11	15	9	13	9	14
	60	13	17	15	19	13	17	13	18
	55	17	21	19	23	17	21	17	22

COOLING AMPERAGE CHART - AIR CONDITIONER

Model	PTC073		PTC074		PTC093		PTC094		PTC123		PTC124		PTC153		PTC154	
Cond Inlet Air Temperature (ºF)	Amperage		Amperage		Amperage		Amperage		Amperage		Amperage		Amperage		Amperage	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
100	2.8	3.0	2.3	2.5	3.5	3.9	2.7	2.9	4.8	5.4	4.0	4.4	6.4	7.1	5.8	6.4
95	2.6	2.9	2.2	2.4	3.3	3.7	2.5	2.8	4.6	5.1	3.8	4.2	6.0	6.7	5.5	6.1
90	2.5	2.8	2.1	2.3	3.2	3.5	2.4	2.7	4.4	4.9	3.7	4.0	5.7	6.4	5.3	5.8
85	2.4	2.7	2.0	2.2	3.0	3.3	2.3	2.5	4.2	4.6	3.5	3.9	5.4	6.0	5.0	5.5
80	2.3	2.5	19	2.1	2.9	3.2	2.2	2.4	4.0	4.4	3.3	3.7	5.1	5.7	4.8	5.3

COOLING AMPERAGE CHART - HEAT PUMPS

Model	PTH073		PTH074		PTH093		PTH094		PTH123		PTH124		PTH153		PTH154	
Cond Inlet Air Temperature (ºF)	Amperage		Amperage		Amperage		Amperage		Amperage		Amperage		Amperage		Amperage	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
100	2.8	3.0	2.4	2.6	3.5	3.9	2.8	3.0	4.8	5.3	4.2	4.6	6.4	7.1	5.7	6.3
95	2.6	2.9	2.3	2.5	3.3	3.7	2.6	2.9	4.5	5.0	4.0	4.4	6.0	6.7	5.4	6.0
90	2.5	2.7	2.1	2.4	3.2	3.5	2.5	2.8	4.3	4.8	3.8	4.2	5.7	6.4	5.2	5.7
85	2.3	2.6	2.0	2.2	3.0	3.3	2.4	2.7	4.1	4.5	3.6	4.0	5.4	6.0	4.9	5.4
80	2.2	2.4	19	2.1	2.9	3.2	2.3	2.5	3.9	4.3	3.4	3.8	5.1	5.7	4.7	5.1

HEATING WATTAGE - HEAT PUMPS

Model		PTH073	PTH074	PTH093	PTH094	PTH123	PTH124	PTH153	PTH154
Temperature		Total Wattage Input	Total Wattage Input	Total Wattage Input	Total Wattage Input	Total Wattage Input	Total Wattage Input	Total Wattage Input	Total Wattage Input
Outside Coil Dry Bulb (ºF)	Room Wet Bulb (ºF)	Min	Max	Min	Max	Min	Max	Min	Max
50	85	615	660	810	855	1095	1180	1450	1585
	80	595	640	790	835	1075	1155	1425	1555
	75	580	625	775	820	1050	1135	1395	1530
	70	565	610	755	800	1030	1110	1370	1500
	65	550	595	735	780	1005	1085	1340	1475
45	85	595	640	775	820	1060	1140	1390	1520
	80	580	625	755	800	1035	1120	1360	1495
	75	560	605	740	785	1015	1095	1335	1470
	70	545	590	720	765	990	1070	1305	1440
	65	530	575	700	745	970	1050	1280	1415
40	85	575	620	740	785	1020	1100	1325	1460
	80	560	605	720	765	1000	1080	1300	1435
	75	545	590	700	745	975	1055	1270	1405
	70	525	570	685	730	950	1035	1245	1380
	65	510	555	665	710	930	1010	1220	1350
35	85	555	600	705	750	985	1065	1265	1400
	80	540	585	685	730	960	1040	1240	1370
	75	525	570	665	710	935	1020	1210	1345
	70	510	555	650	695	915	995	1185	1315
	65	490	535	630	675	890	975	1155	1290

SERVICING

HEATING CHANGE OF TEMPERATURE - HEAT PUMPS									
Model		**PTH073**	**PTH074**	**PTH093**	**PTH094**	**PTH123**	**PTH124**	**PTH153**	**PTH154**
Temperature									
Outside Coil Dry Bulb (°F)	**Room Wet Bulb (°F)**	**Temperature Across Indoor Coil (ΔT)**	**Temperature Across Indoor Coil (ΔT)**	**Temperature Across Indoor Coil (ΔT)**	**Temperature Across Indoor Coil (ΔT)**	**Temperature Across Indoor Coil (ΔT)**	**Temperature Across Indoor Coil (ΔT)**	**Temperature Across Indoor Coil (ΔT)**	**Temperature Across Indoor Coil (ΔT)**
		Min	Max	Min	Max	Min	Max	Min	Max
50	85	21	25	27	32	30	34	29	33
	80	22	26	28	33	31	35	30	34
	75	23	27	29	34	32	36	31	35
	70	24	28	30	35	33	37	32	36
	65	25	29	31	36	34	38	33	37
45	85	18	23	24	29	27	32	28	33
	80	19	24	25	30	28	33	29	34
	75	2	25	26	31	29	34	30	35
	70	21	26	27	32	30	35	31	36
	65	22	27	28	33	31	36	32	37
40	85	16	21	22	26	25	30	28	33
	80	17	22	23	27	26	31	29	34
	75	18	23	24	28	27	32	30	35
	70	19	24	25	29	28	33	31	36
	65	20	25	26	30	29	34	32	37
35	85	14	18	19	24	23	27	28	32
	80	15	19	20	25	24	28	29	33
	75	16	20	21	26	25	29	30	34
	70	17	21	22	27	26	30	31	35
	65	18	22	23	28	27	31	32	36

SERVICING

DIGITAL BOARD DIAGNOSTICS

If a failure is detected on the digital board, there will be a green light constantly lit up. This light is located under the OFF touch pad button. The board will need to be programmed in the Diagnostic Mode to determine failure code and procedures to follow to correct problem.

Diagnostic Maintenance & Status Report

The Diagnostic Maintenance & Status Report Mode provides detailed information on PTAC control operation and operational status including present modes, failures, airflow restriction warnings, operating temperatures, and past failures. The lower right hand dot on the center display flashes in this mode. In some cases the green LED located in the lower left hand corner of the touchpad below the OFF key will also be lit. This Green LED "Status Light" only illuminates if there is an status code that has been activated and should be reviewed. In most cases, this light indicates that the indoor room filter is dirty should be cleaned or replaced. **NOTE:** Dirty filters cause the unit to consume more energy than normally needed to condition a room. Once the filter has been cleaned or replaced, the LED should go out. If the LED is still illuminated after the filter has been cleaned, activate the Diagnostic and Status mode to view any active codes. The unit may need additional cleaning or maintenance of the evaporator or condenser coils. Please perform this step before calling a servicer. **A servicer should be called only if cleaning the filter or coils does not clear the status code or the code indicates that servicer should be called.**

DIAGNOSTIC STATUS REPORT MODE.

To enter **Diagnostic Status Report mode, press and hold the up and down arrows and, while holding, quickly press the COOL key twice.**

Active Failures.

- If there are no active failures or lockouts, the display will show a double dash, "- -". If there is a code listed, see the unit "Diagnostic Codes" chart for a list of definitions.

Operating Temperatures.

- If not in Diagnostic Status Report Mode, enter as instructed above and press the Fan Speed key.
- If already in Diagnostic Status Report mode, press the Fan Speed key. The display will show the temperature of the desired set point, **SP**; the temperature at the wireless thermostat, **rL**; the indoor ambient temperature behind the filter, **IA**; the indoor coil temperature, **IC**; the indoor discharge air temperature, **Id**; the outdoor coil temperature, **OC**; the outdoor ambient temperature, **OA**; and the spare probe temperature, **IH**. If any of the probes are not populated the display will show the corresponding failure code.

Past Failure Log

- If not in Diagnostic Status Report Mode, enter as instructed above and press the Fan Speed key twice.
- If already in Diagnostic Status Report mode, press the Fan Speed key. While the display is showing operating temperatures, the last 10 failure codes active or past can be requested by pressing the Fan Speed key again. The codes are displayed last entry first followed subsequently by each preceding code.

Note that modes F1 and Fd are also displayed in the normal control operation (see "Diagnostic Codes" chart).

To exit **Diagnostic Status Report mode, press** the OFF key.

SERVICING

DIAGNOSTIC CODES

	CODE	STATUS	DISPLAY	ERROR LIGHT	SUGGESTED ACTION
FAILURES	**FP**	**Freeze Protection** Engaged. The room temperature measured by the wireless remote thermostat or indoor ambient thermistor active sensor falls below 40°F.	Y	N	This feature can be disabled by the Unit Configuration Settings; however, this setting would **disengage** as soon as the ambient room temperature rises above 43°F.
	Fd	**Front Desk** switch is closed. All outputs are switched off.	Y	N	Open front desk switch.
	F1	Indoor Ambient Thermistor reads outside the range -20°F to 200°F **&** the wireless thermostat is not communicating to the unit control or Indoor Ambient Thermistor (IAT) without a wireless remote thermostat reads outside the range -20°F to 200°F	Y	Y	Replace red Indoor Ambient Thermistor or Wireless Remote Thermostat.
	F4	Indoor Coil Thermistor either above or below operating tolerances.	N	Y	Replace Red Indoor Coil Thremister
	F5	Wireless Thermostat failure	N	Y	Replace Wireless Thermostat
	F6	Indoor Discharge Thermistor either above or below operating tolerances.	N	Y	Replace Yellow Indoor Discharge Thermistor
	Fb	Low Remote Battery	N	Y	Replace Battery in Wireless Devices.
LOCKOUTS	**L6**	Discharge Air Too Hot. Indoor Discharge Thermistor senses output greater than 175°F.	N	Y	Clean Filter or Remove Air Blockage
	L8	Heating temperature change too large	N	Y	Clean Filter or Evaporator Coil
	L9	Cooling temperature change too large	N	Y	Clean Filter or Evaporator Coil
	LC	Outdoor Coil Thermistor temperature high	N	Y	Clean Condensor Coils, Check Fan fault code. Code will reset after cleaning.
WARNINGS	**C1**	Clean Indoor Coil / Filter	N	Y	Check for blocked Indoor Air
	C0	Clean Outdoor Coil	N	Y	Check for blocked Outdoor Air

PTAC ANALYSIS CHART

Complaint	No Heat							Unsatisfactory Cooling					System Operating Pressures				Test Method Remedy	See Service Procedure Reference
POSSIBLE CAUSE DOTS IN ANALYSIS GUIDE INDICATE "POSSIBLE CAUSE" SYMPTOM	System Will Not Start	Compressor will not start - fan runs	Compressor and Condenser Fan will not start	Evaporator fan will not start	Condenser fan will not start	Compressor runs - goes off on overload	Compressor cycles on overload	System runs continuously - little cooling	Too cool and then too warm	Not cool enough on warm days	Certain areas too cool others, too warm	Compressor is noisy	Low suction pressure	Low head pressure	High Suction Pressure	High head pressure		
Power Failure	●																Test Voltage	S-1
Blown Fuse	●		●	●													Impact Fuse Size & Type	
Loose Connection	●			●		●											Inspect Connection - Tighten	S-2
Shorted or Broken Wires	●	●	●	●	●	●											Test Circuits With Ohmmeter	S-3
Open Overload	●	●		●	●												Test Continuity of Overloads	S-17A
Faulty Thermostat	●			●					●								Test Continuity of Thermostat & Wiring	S-3
Shorted or Open Capacitor		●			●	●											Test Capacitor	S-15
Internal Overload Open	●																Test Continuity of Overload	S-6
Shorted or Grounded Compressor		●				●											Test Motor Windings	S-17
Compressor Stuck	●					●											Use Test Cord	S-17
Open Control Circuit				●													Test Control Circuit with Voltmeter	S-1
Low Voltage		●				●	●										Test Voltage	S-1
Faulty Evap or Cond. Fan Motor				●									●				Repair or Replace	S-16
Shorted or Grounded Fan Motor					●											●	Test Motor Windings	S-16
Shortage or Refrigerant							●	●					●	●			Test for Leaks, Replace Drier	S-1, S-2
Restructed Liquid Line							●	●					●	●			Replace Restricted Part	
Dirty Air Filter								●		●	●		●			●	Inspect Filter - Clean or Replace	
Dirty Indoor Coil								●		●	●		●			●	Inspect Coil - Clean	
Too Much Air across Indoor Coil															●		Reduce Blower Speed	
Overcharge of Refrigerant						●	●								●	●	Recover & Replace Cap Tube	S-116
Dirty Outdoor Coil						●	●			●						●	Inspect Coil - Clean	
Noncondensibles							●			●						●	Remove Charge, Replace Cap Tube	S-1, S-2
Recirculation of Condensing Air							●			●						●	Remove Obstruction to Air Flow	
Infiltration of Outdoor Air								●		●	●						Check Windows, Doors, Vent Fans, etc.	
Improperly Located Thermostat						●			●								Relocate Thermostat	
System Undersized								●		●							Refigure Cooling Load	
Broken Internal Parts												●					Replace Compressor	S-17
Broken Values												●					Test Compressor Efficiency	S-104
Inefficient Compressor								●						●	●		Test Compressor Efficiency	S-104

SERVICING

S-1 Checking Voltage

WARNING

LINE VOLTAGE NOW PRESENT.

1. Using a voltmeter, measure the voltage across terminals L1 and L2 of the outlet.
2. No reading - indicates open wiring, open fuse(s), no power or etc. from the unit to fused disconnect service. Repair as needed.

S-2

1. Visually inspect all the wires.
2. Check wires for loose connections (tighten as needed or replace Terminal if needed).
3. Check wires for pinched or cut wires.

S-3 Checking Thermostat, Wiring and Anticipator

WARNING

LINE VOLTAGE NOW PRESENT.

With power ON and thermostat calling for cooling.

1. Use a voltmeter to check for 24 volts at thermostat wires C and R on the terminal strip of the control board.
2. No voltage indicates trouble in the thermostat, wiring or external transformer source.
3. Check the continuity of the thermostat and wiring. Repair or replace as necessary.

S-5 Floodback Protector or Thermistor

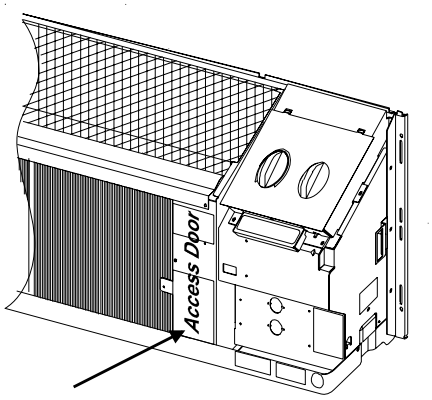
FLOODBACK PROTECTOR

Opens at 30° F, Closes 60°F

INDOOR COIL THERMISTOR

See page 45 for resistance/temperature

1. Remove front cover.
2. Remove control knobs by pulling straight up away from the escutcheon. *(Skip this step if unit has a digital board.)*
3. Remove the escutcheon by lifting front of escutcheon up and pulling top tabs from holes. *(Skip this step if unit has a digital board.)*
5. Remove the two mounting screws, one on each side of the control board cover. Tilting the control panel out, remove the cover.
6. Disconnect the floodback protector wiring or thermistor from the control board's Indoor Switch terminals.
7. Remove the two screws securing the top screen to the evaporator assembly. (Be sure to slide the top of the screen between the top flange and chassis when reassembling.)
8. Remove the two screws securing the heater assembly to the evaporator.
9. Pull heater assembly up and out of the chassis.
10. Disconnect floodback protector.
11. If the unit has a Red Thermistor on the indoor coil follow steps 1-6 then steps 12 and 13.
12. Remove the access panel on the evaporator assembly.



13. The thermistor is clipped on the vertical section of the 90º bend of the inlet line to the indoor coil. Unclip the thermistor and remove.

Checking Floodback Protector Thermostat

1. With power off, remove the floodback protector thermostat leads from the circuit board.
2. Check the floodback protector thermostat for continuity. Below 30º ± 5ºF, the thermostat should read open. Above 60º + 6ºF, the thermostat should always read closed. Between 30 ± 5ºF and 60º ± 5ºF, the thermostat will read open if coil temperature has been below 30º ± 5ºF and not yet reset by going above 60º ± 5ºF. Otherwise, the thermostat will read closed.

S-5 Outdoor Coil Thermostat or Thermistor

OUTDOOR THERMOSTAT OR THERMISTOR

1. Remove chassis from wall sleeve..
2. Remove control knobs by pulling straight up away from the escutcheon. *(Skip this step if unit has digital board.)*
3. Remove the escutcheon by lifting front of escutcheon up and pulling top tabs from holes. *(Skip this step if unit has digital board.)*
4. Remove the two mounting screws, one on each side of the control board cover. Tilting the control panel out, remove the cover.
5. Disconnect outdoor thermostat wiring from the control board OD STAT terminal or unplug the Blue Thermistor from the connector.
6. Remove the outdoor thermostat from the outside coil.
7. Carefully slide thermostat wiring through the center partition. When replacing, be sure all holes in the center partition are properly sealed with Permagum.S-5 Outdoor Coil Thermostat or Thermistor (Switchover Thermostat)

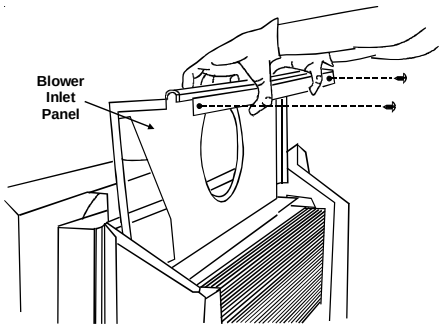
Checking Switchover Thermostat

1. With power off, remove the switchover thermostat leads from the circuit board.
2. Check, the switchover thermostat for continuity . Below 25° ±5°F the thermostat should read open. Above 60° + 6°F the thermostat should always read closed. Between 25° ±5°F and 50° ±5°F the thermostat will read open if coil temperature has been below 25° ±5°F and not yet reset by going above 50°±5°F otherwise the thermostat will read closed
3. Replace the switchover thermostat if it does not test as above.
4. The "C-K" models with the blue thermistor on the outdoor coil, will lock out the compressor at 24°. The compressor will re-engage when the coil temperature has warmed up to 33°. **See Thermistor OHMS values in the chart on page 45.**

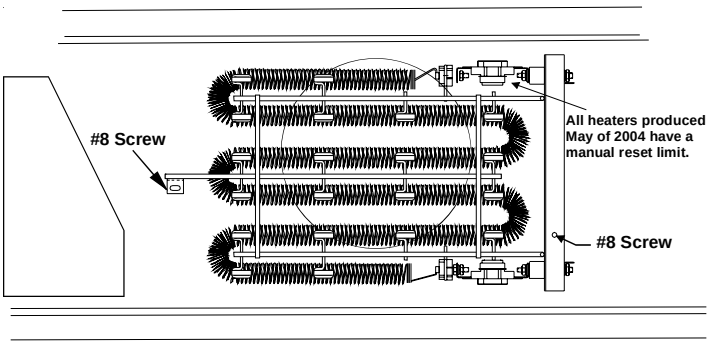
S-6 Heater Assembly

HEATER ASSEMBLY

1. Remove front cover.
2. Remove the two mounting screws holding the screen above the indoor coil in place. Remove the screen. (Be sure to slide the top of the screen between the top flange and chassis when reassembling.)
3. Remove the two screws holding the blower inlet panel in place. Lift the blower inlet panel out of the unit and set aside.



4. Remove heater from the blower inlet panel by removing the two #8 mounting screws.S-6 Heater Assembly



5. All heater assembly components are now accessible.
6. All heaters manufactured after May of 2004 have a manual reset limit on the heater. **See image at bottom of previous column**.

Checking Heater Assembly

1. With power off to the unit and heater, remove the heaters in question and visually inspect the element for broken condition.
2. Remove the wires from the element and check for continuity through the heater. If there is no continuity the heater needs to be replaced.

S-7 Drain Pan Valve (Heat Pump Models Only)

DRAIN VALVE

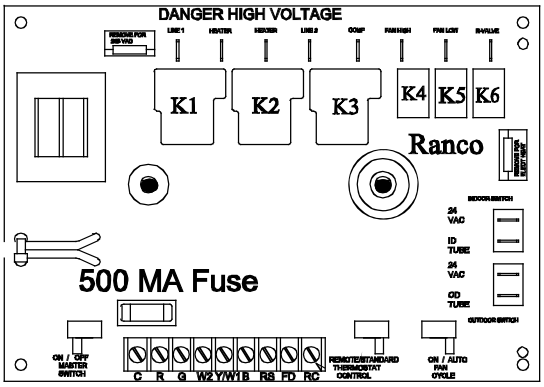
1. Remove the chassis from the wall sleeve.
2. Remove the mounting screw and remove the drain valve.

The drain pan perates to remove condensate from base pan. This is a thermal operated device that opens at 40°F and closes at 60°F.

Checking Operation of the Drain Valve

1. Cool the valve to 40°F or below and the plunger should open.
2. Warm the valve up to 60°F and the plunger should close.

S-10a Fuse Replacement

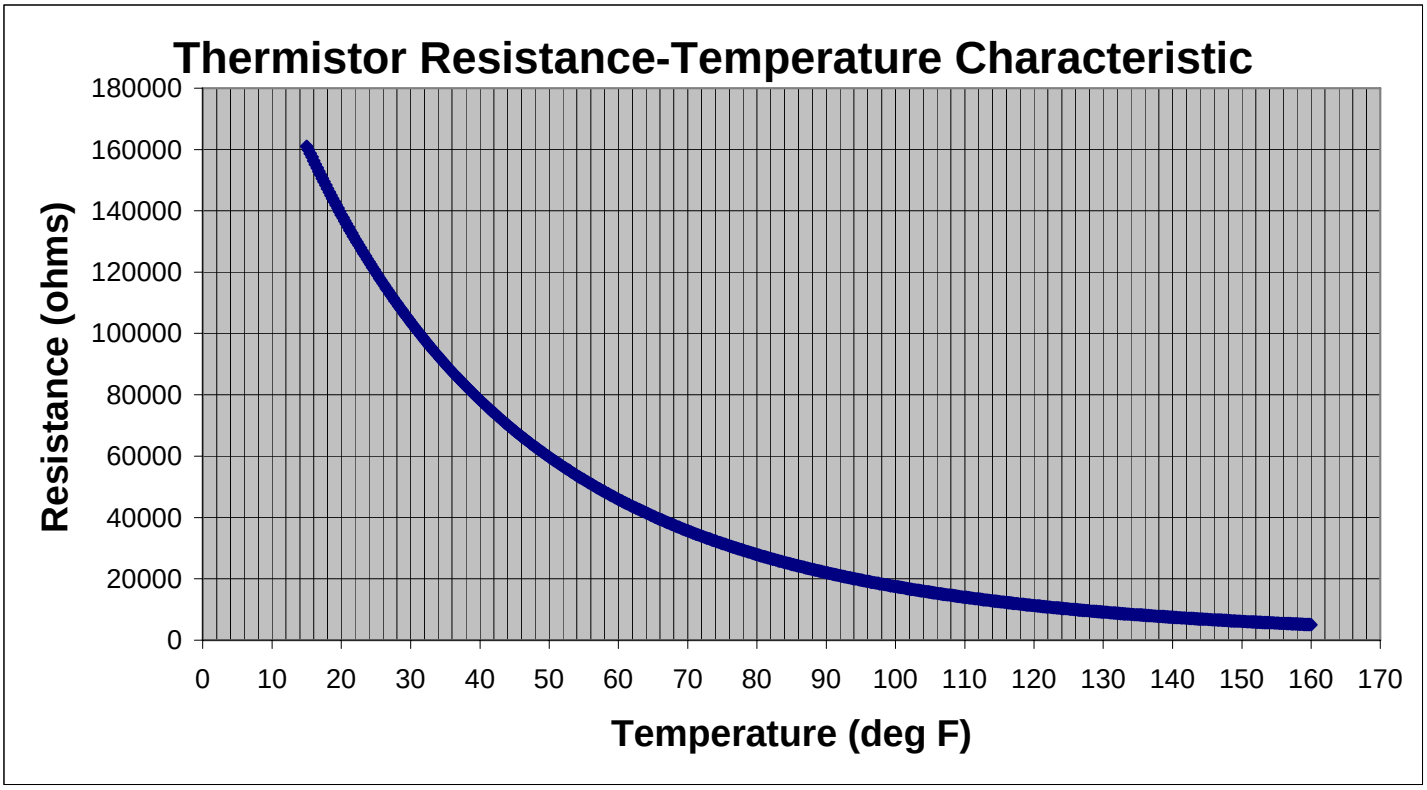


Control Board

The above boards fuse should be removed form the holder and checked with a ohm meter. Continuous ohms indicate a good fuse on reading indicates a open fuse replace fuse. The fuse can only be replaced once. After the first replacement, the unit must be checked for cause of repeated failure.

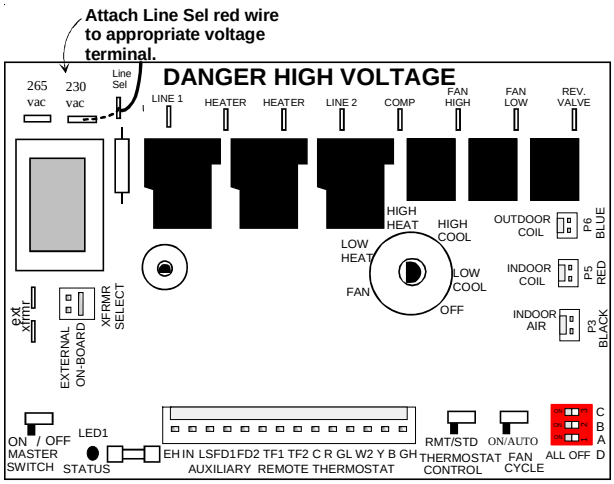
Ranco control boards have two fuses in a plastic holder. If the fuse is blown, turn the holder over and insert the new fuse. If the unit still does not operate check the fuse with a ohm meter. The fuse can only be replaced once. After the first replacement, the unit must be checked for cause of repeated failure. **"G" & "K" model boards do not have fuses.**

THERMISTOR RESISTANCE - TEMPERATURE CHARACTERISTIC



SERVICING

S-15 Capacitor Check



CAPACITOR

1. Remove front cover.
2. Remove control knobs by pulling straight up away from the escutcheon.
3. Remove the escutcheon by lifting front of escutcheon up and pulling top tabs from holes.
4. Remove the two mounting screws, one on each side of the control board cover. Tilting the control panel out, remove the cover.
5. Disconnect all wiring to the capacitor. Label the wires to ensure proper reassembly.
6. Remove the screw securing the capacitor mounting clamp to the center partition. Remove the capacitor.

Resistance Check

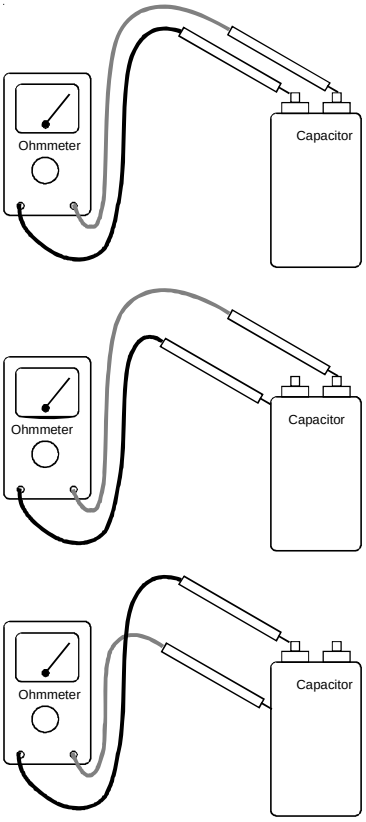
WARNING

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

Discharge capacitor and remove wire leads.

WARNING

DISCHARGE CAPACITOR THROUGH A 20 TO 30 OHM RESISTOR BEFORE HANDLING.



Capacitor Resistance TEST

1. Set an ohmmeter on its highest ohm scale and connect the leads to the capacitor -
   a. Good Condition - indicator swings to zero and slowly returns to infinity. (Start capacitor with bleed resistor will not return to infinity. It will still read the resistance of the resistor).
   b. Shorted - indicator swings to zero and stops there - replace.
   c. Open - no reading - replace. (Start capacitor would read resistor resistance).
2. Testing for ohms between either capacitor terminal and the capacitor body must show infinite ohms.

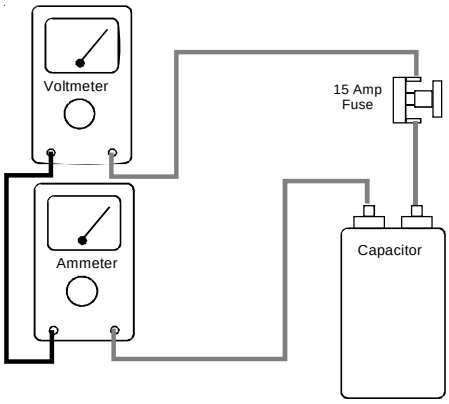
Capacitance Check

Using a hookup as shown below, take the amperage and voltage readings and use them in the formula:

WARNING

LINE VOLTAGE NOW PRESENT.

SERVICING



Testing Capacitance

Capacitance (MFD) = 2650 X Amperage / Voltage

If the value obtained is not within 10% of the rating printed on the capacitor, replace.

S-16 Checking Fan and Motor Blower Windings

BLOWER WHEEL, BLOWER MOTOR, FAN BLADE

1. Remove chassis from the wall sleeve.
2. Remove control knobs by pulling straight up away from the escutcheon.
3. Remove the escutcheon by lifting front of escutcheon up and pulling top tabs from holes.
4. Remove the two mounting screws, one on each side of the control board cover. Tilting the control panel out, remove the cover.
5. Remove the two screws securing the top screen to the evaporator assembly. (Be sure to slide the top of the screen between the top flange and chassis when reassembling.)
6. Remove the two screws securing the heater assembly to the evaporator.
7. Pull heater assembly up and out of the chassis.
8. Loosen the Allen screw securing the clamp holding the blower wheel on the motor shaft.
9. Pull the blower wheel off the shaft.
10. Disconnect the blower motor wiring as follows:

    White from capacitor C terminal

    Red from control board FAN LOW terminal

    Brown from capacitor FAN terminal

    Black from control board FAN HIGH terminal

    Gently pull the wire through the center partition.
11. Remove the two screws securing the side center partition side brace to the top brace. Remove the brace.
12. Remove the two screws securing the condenser air baffle to the center partition. Remove the brace.
13. Remove all screws from the sides of the outdoor coil securing the shroud to the coil.
14. Pressing the tabs on the right side of the shroud separate the shroud from the outdoor coil.
15. Remove the two screw securing the outdoor coil to the base pan.
16. Carefully lift the outdoor coil over the basepan lip away from the fan wheel.
17. Push the shroud back toward the center partition panel.
18. Loosen the Allen screw securing the fan wheel clamp to the motor shaft. Remove the fan blade. The fan blade must be 1 inch away from the outdoor coil when reinstalled.
19. Remove the three mounting bolts securing the fan motor to the center partition. Remove the motor.S-16 Checking Fan and Motor Blower Windings

The auto reset fan motor overload is designed to protect the motor against high temperature and high amperage conditions by breaking the common circuit within the motor, similar to the compressor internal overload. However, heat generated within the motor is faster to dissipate than the compressor, allow at least 45 minutes for the overload to reset, then retest.

WARNING

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

1. Remove the motor leads from their respective connection points and capacitor (if applicable).
2. Check the continuity between each of the motor leads.
3. Touch one probe of the ohmmeter to the motor frame (ground) and the other probe in turn to each lead.

If the windings do not test continuous or a reading is obtained from lead to ground, replace the motor.

WARNING

TO PREVENT PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK, ONLY QUALIFIED SERVICE PERSONNEL ARE AUTHORIZED TO USE THE DIAGNOSTIC BOX OR THIS PROCEDURE.

S-17 Compressor Windings

COMPRESSOR

1. Remove the chassis from the wall sleeve.
2. Remove the compressor terminal cap and disconnect all compressor wiring.
3. After capturing the refrigerant from the system, debraze the inlet and discharge tubing from the compressor.
4. Remove the three foot mounting bolts and remove the compressor.

SERVICING

⚠ WARNING

TO PREVENT PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK, DO NOT CONNECT ELECTRICAL POWER TO THIS UNIT OR TO THE COMPRESSOR IF THE COMPRESSOR TERMINAL COVER HAS BEEN REMOVED OR IS NOT FIRMLY IN PLACE.

If the test indicates shorted, grounded or open windings, see procedure for the next steps to be taken.

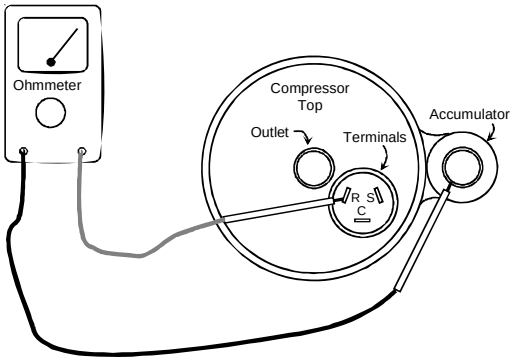
Resistance Test

1. With no power, remove the leads from the compressor terminals.
2. Touch the leads of an ohmmeter to terminals C-S, start windings and C-R, run winding.

Ground Test

With no power and compressor leads removed:

Set an ohmmeter on its highest scale. Touch one lead to the compressor body (clean point of contact, as a good connection is a must) and the other probe to each compressor terminal in turn. If a reading is obtained, then the compressor is grounded and must be replaced.



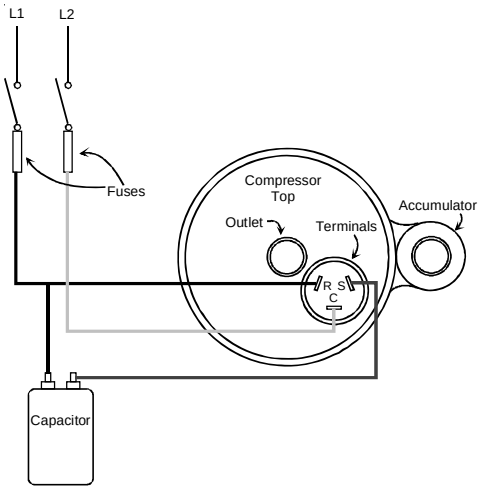
Compressor Ground Test

If the voltage, capacitor, overload and motor windings test fail to show the cause for failure.

With no power, wire a test cord to line voltage (L1 & L2).

NOTE: The wire size of the test cord must equal the line size, and the fuses in the test line must be of the proper size and type.

Test Cord Connections



1. Connect a good capacitor of the right MFD and voltage rating into the circuit as shown.
2. Carefully apply line voltage.
   a. If the compressor starts and continues run, the cause for failure is somewhere else in the system.
   b. If the motor fails to start - replace.

Since all single phase compressors are of the permanent split capacitor design the high and low side pressure must be approximately equal or the low torque compressor may not start.

S-17A Overload

Each compressor is equipped with an internal overload.

The line break internal overload senses both motor amperage and winding temperature. High motor temperature or amperage heats the disc causing it to open, breaking the common circuit within the compressor.

Fuse, circuit breaker, ground fault protective device, etc. has not tripped.

1. With no power to the unit, remove the compressor cover, and overload lead from the compressor terminal.
2. Using an ohmmeter: Test continuity between terminals of the overload. If not continuous, the overload is open, replace the overload.

S-104 Checking Compressor Efficiency

The reason for compressor inefficiency is broken or damaged suction and/or discharge valves, or scroll flanks on Scroll compressors, reducing the ability of the compressor to pump refrigerant vapor.

The condition of the valves or scroll flanks is checked in the following manner.

1. Attach gauges to the high and low side of the system.
2. Start the system and run a "Cooling Performance Test.

If the test shows:

a. Below normal high side pressure.

b. Above normal low side pressure.

c. Low temperature difference across coil.

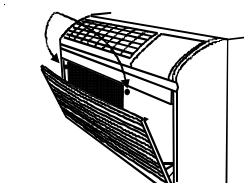
d. Low amp draw at compressor.

and the charge is correct. The compressor is faulty - replace the compressor. **NOTE:** THIS TEST CANNOT BE DONE IN THE HEATING MODE.

S-116 Filter Drier Replacement

⚠ WARNING
HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

1. Remove the two screws securing the front. Not all installations have the screws. Then remove the front. Do this by pulling the bottom corners out and lifting up.

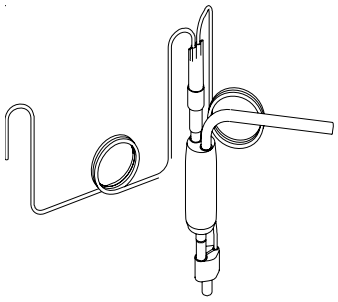


2. Remove the six screws securing the unit to the wall sleeve. If screws are not present they should be installed when units is reinstalled.
3. Pull unit from wall sleeve and take unit to adequate work area. Taking care not to spill any condensate which may still be in the basepan.

IMPORTANT NOTE: Effective July 1,1992. Before opening any refrigerant system it is the responsibility of the service technician to capture the refrigerant for safe disposal.

4. After all the refrigerant has been recovered from the system, remove bottom of strainer by unbrazing the strainer from the condenser elbow. Hold the strainer with a pair of pliers while heating up the brazed joint with a torch. When joint is hot pull up on strainer and remove.

Heat up Capillary tube and remove from line.



5. To install the new filter drier assembly, remove the end plugs and clean the ends to be brazed into place.
6. Clean the end of the capillary tube and insert into the tube, it may be necessary to crimp tubing around the capillary tube, being careful not to damage the capillary tube. Insert the bottom of the filter drier into the condenser elbow, it may be necessary to heat slightly to get coupling to go into place.

Brazing

⚠ WARNING
BRAZING REQUIRES HIGH TEMPERATURES. TAKE PRECAUTION TO PROTECT AGAINST PERSONAL INJURY OR PROPERTY DAMAGE.

Satisfactory results require cleanliness, experience and the use of proper material and equipment.

The connections to be brazed must be properly sized, free of rough edges and clean.

The generally accepted materials are:

- **SIL-FOS** (Alloy of 15% silver, 80% copper, 5% phosphorus) is used without flux on copper to copper. *DO NOT USE FOR A COPPER TO STEEL CONNECTION.* Recommended heat is approximately 1400°F.
- **SILVER SOLDER** (Alloy of 30% silver, 38% copper, 32% zinc.) Is used with fluoride base flux on copper to steel, brass to copper, steel to steel, brass to steel. Recommended heat is approximately 1200°F. This is the most important part of the entire service procedure.

8. Braze coupling and cap tube into place.

S-122 Reversing Valve

Occasionally the reversing valve may stick in the heating or cooling position or in the mid-operation.

When stuck in the mid-position, part of the discharge gas from the compressor is directed back to the suction side resulting in excessively high suction pressure.

Check the operation of the valve by starting the system and switching the operation from COOLING to HEATING and then back to COOLING.

If the valve fails to change its position, test the voltage (230 V. or 265 V.) at the valve coil connector cap, while the system is on the HEATING CYCLE.

⚠ WARNING
SET THE THERMOSTAT ALL THE WAY COUNTER-CLOCKWISE TO PREVENT THE FAN FROM SUDDENLY COMING ON AND ENDANGERING THE SERVICER'S HANDS.

DISASSEMBLY

If no voltage is registered to the coil, check the operation of the reversing relay and the continuity of the connecting wires.

If voltage is registered at the coil, tap the valve body lightly while switching the system from HEATING to COOLING etc. If this fails to cause the valve to switch position, remove the coil connector cap and wiring and test the continuity of the valve coil. If the coil does not test continuous replace it.

If the valve is inoperative, replace.

SOUND LEVEL

Noise complaints are frequently caused by a faulty installation or by the customer's lack of knowledge and information. Sources of actual noise may be traced to operational components, tubing vibration, or misalignment of case or sleeve with chassis.

COMPONENT REPLACEMENT

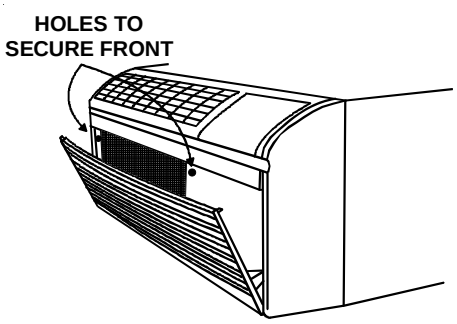
Replacement of the compressor, evaporator, condenser, capillary tubes and reversing valve must be in accordance with accepted service practices. These procedures include a complete evacuation of both high and low sides, and changing of both strainer whenever the refrigerant system is opened.

Before replacing a component in the sealed system, make sure that the cause for complaint does not lie in the electrical circuit, control, overload or is due to some other reason. The serviceman must be familiar with the operational characteristics of the product and should not jump to conclusions.

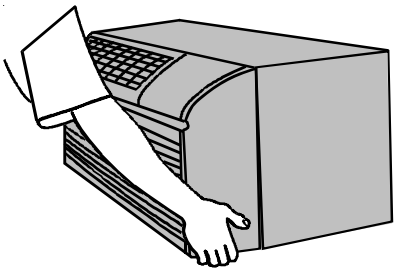
FRONT COVER

1. Remove the two screws securing the front to the chassis.

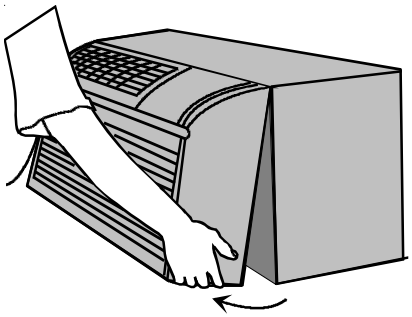
NOTE: Not all installations will use these screws.



2. Grasp the cabinet front as shown.



3. Pull the bottom of the cabinet front away from the chassis until the retaining clips disengage.



4. Lift the cabinet front off the chassis. Reverse this procedure to reinstall the cabinet front.

CHASSIS

1. Disconnect power to the unit.
2. Remove the front cover.
3. Remove three screws on each side of the chassis, securing the chassis to the wall sleeve.
4. Carefully slide chassis out of wall sleeve, placing on floor or protected cart.

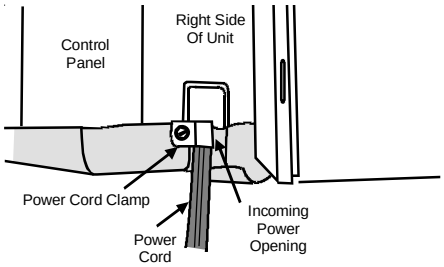
ESCUTCHEON, CONTROL BOARD, CONTROL PANEL

1. Remove front cover.
2. Remove control knobs by pulling straight up away from the escutcheon.
3. Remove the escutcheon by lifting front of escutcheon up and pulling top tabs from holes. **"E-K" models the escutcheon is permenantly attached to the cover.**
4. Remove the two mounting screws, one on each side of the control board cover. Tilting the control panel out, remove the cover.
5. Disconnect all wiring to the control board. Label the wires to ensure proper reassembly.
6. Remove the thermistor in front of the evaporator.
7. Remove the four control board mounting screws and remove the control board.

POWER CORD

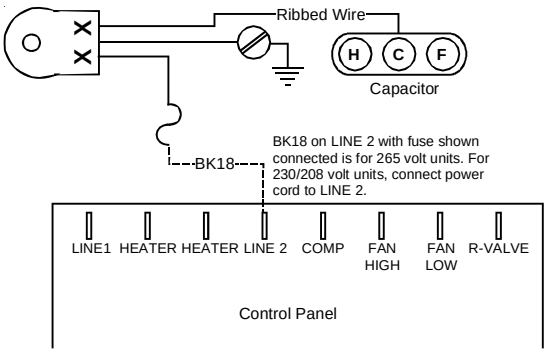
1. Remove the unit front by tilting the bottom of the front outward and then lift the front straight up.
2. Remove the control knobs on the control panel cover by pulling upward on the knobs. Remove the escutcheon.
3. Remove the control panel cover by removing the two screws holding the control panel cover. Tilt the control panel forward to gain access to the wires.
4. Remove the power cord clamp located near the bottom right of the chassis.

DISASSEMBLY



5. On *230/208 volt* units disconnect the ribbed lead from the C terminal on the capacitor and the smooth lead from LINE 2 terminal on the control board and the green ground wire from the partition panel.

   On *265 volt* units disconnect the ribbed lead from the C terminal on the capacitor and the smooth lead from the fuse holder and the green ground wire from the partition panel.



EVAPORATOR

1. Remove front cover.
2. Remove control knobs by pulling straight up away from the escutcheon.
3. Remove the escutcheon by lifting front of escutcheon up and pulling top tabs from holes.
4. Remove the two mounting screws, one on each side of the control board cover. Tilting the control panel out, remove the cover.
5. Lift control panel off hinges and shift out of the way.
6. Remove the two screws securing the top screen to the evaporator assembly. (Be sure to slide the top of the screen between the top flange and chassis when reassembling.)
7. Remove screws on mid partition panel and shift out of the way.
8. Remove the two screws securing the heater assembly to the evaporator.
9. Pull heater assembly up and out of the chassis.
10. Disconnect all wiring to the heater assembly and remove the assembly.
11. Remove the floodback protector or thermistor from the evaporator discharge tube.
12. Remove screws holding evaporator to basepan and partition panel.
13. After recapturing the refrigerant charge (see Refrigeration Service section), debraze the tubes into the evaporator. Be sure to protect all chassis components, especially foam parts, from excessive heat.
14. Lift the evaporator up over the basepan edge and remove.

OUTDOOR COIL

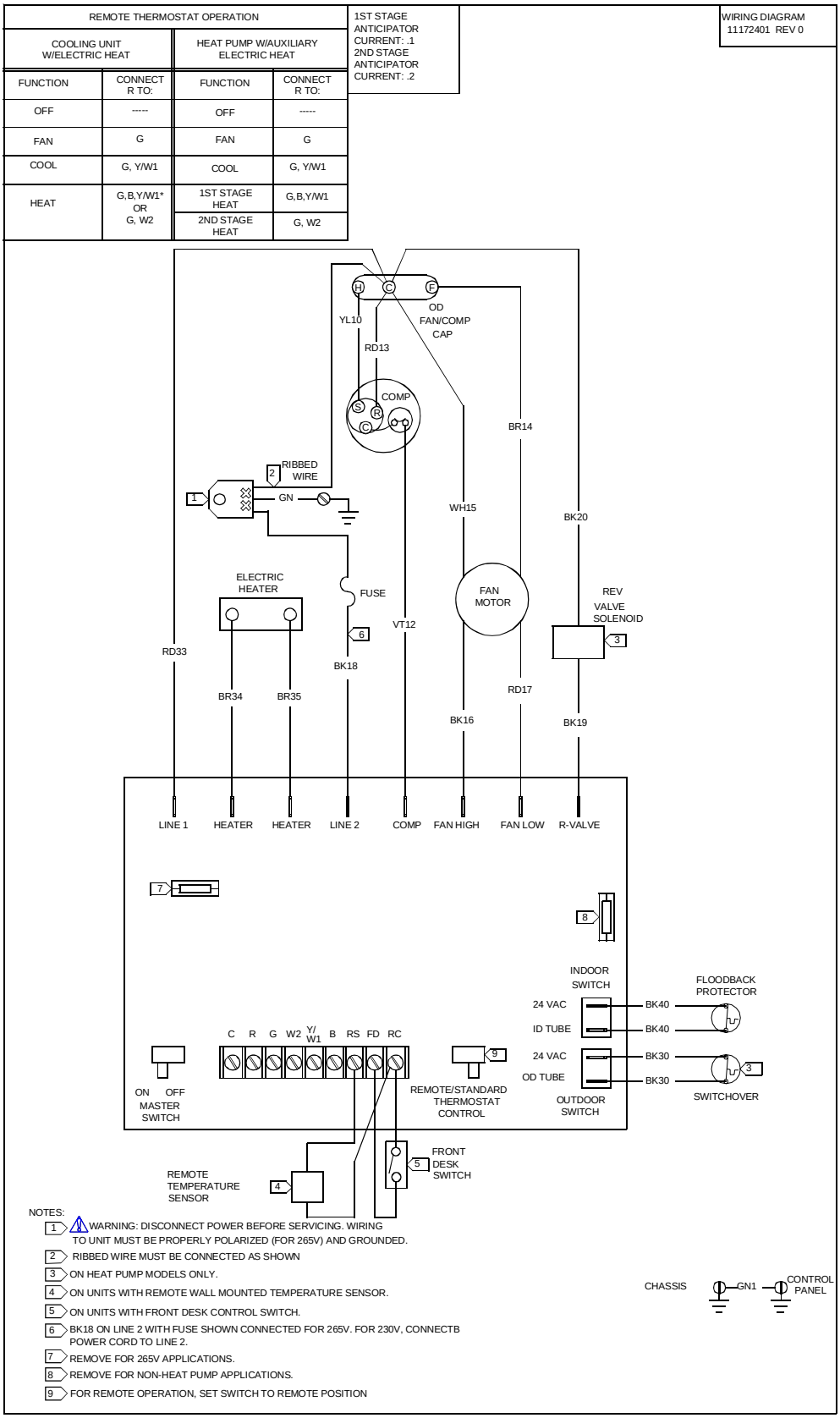
1. Remove the chassis from the wall sleeve.
2. After capturing the refrigerant from the system, debraze the inlet and discharge tubing from the outdoor coil.
3. Remove all screws from the sides of the outdoor coil securing the shroud to the coil.
4. Pressing the tabs on the right side of the shroud separate the shroud from the outdoor coil.
5. The "E-K" models have a four piece condenser shroud where the top, sides and schroud will come apart separately.
5. Remove the two screw securing the outdoor coil to the base pan.
6. Carefully lift the outdoor coil over the basepan lip.

VENT DOOR

1. Remove Chassis from wall sleeve.
2. Remove P clamp securing vent door control cable to center partition and disconnect cable from vent door.
3. Remove vent door by opening door and pulling hinge tabs out of slots in center partition.
4. Remove the door by pulling hinge tabs out away from the center partition.

SCHEMATICS

WARNING **TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.**



PTC and PTH Standard Unit - One Stage Heat (Temperature Sensor and Front Desk Control Added)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

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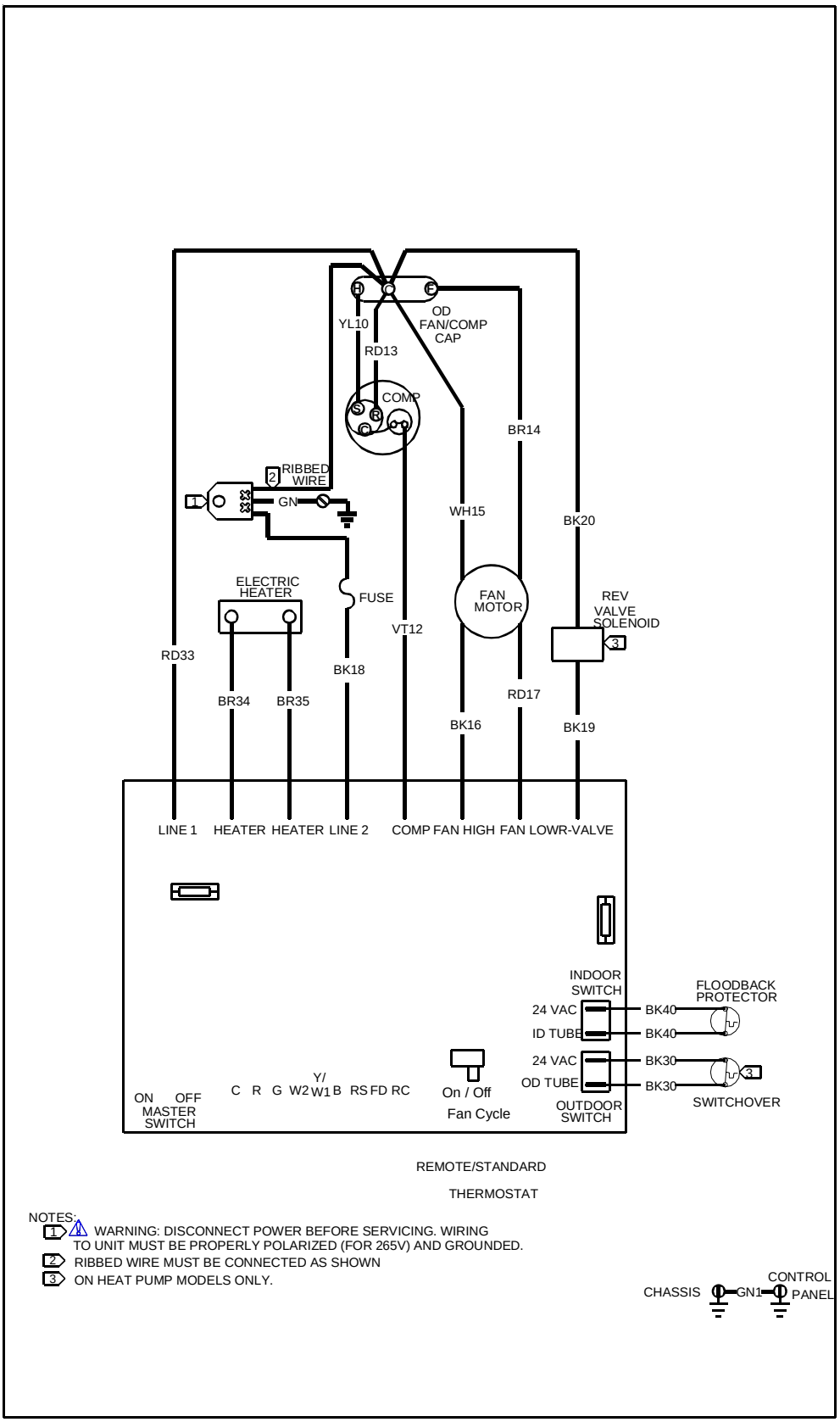

NTE and NTP Standard Unit

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

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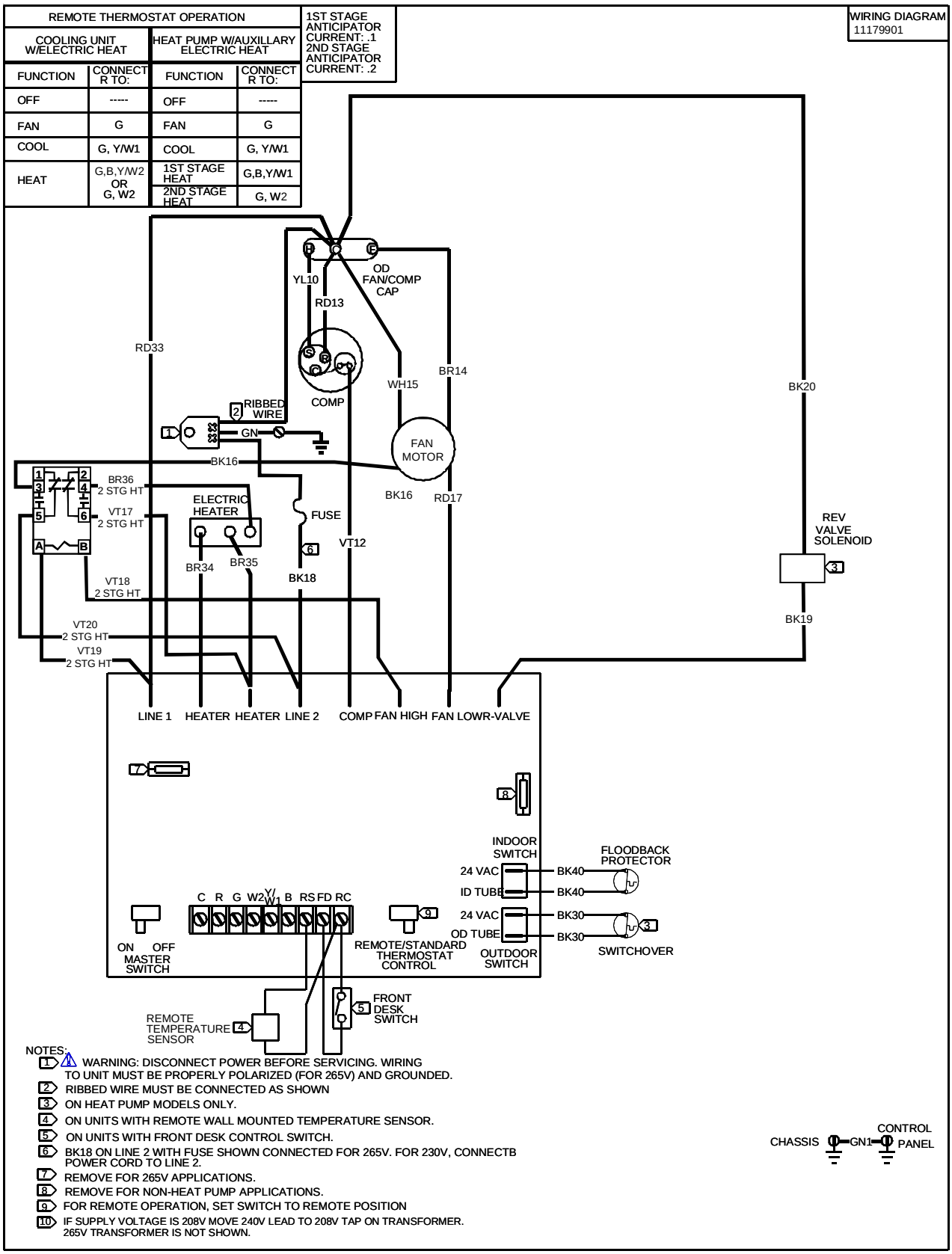

PTC and PTH Standard Unit - Two Stage Heat (Temperature Sensor and Front Desk Control Added)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

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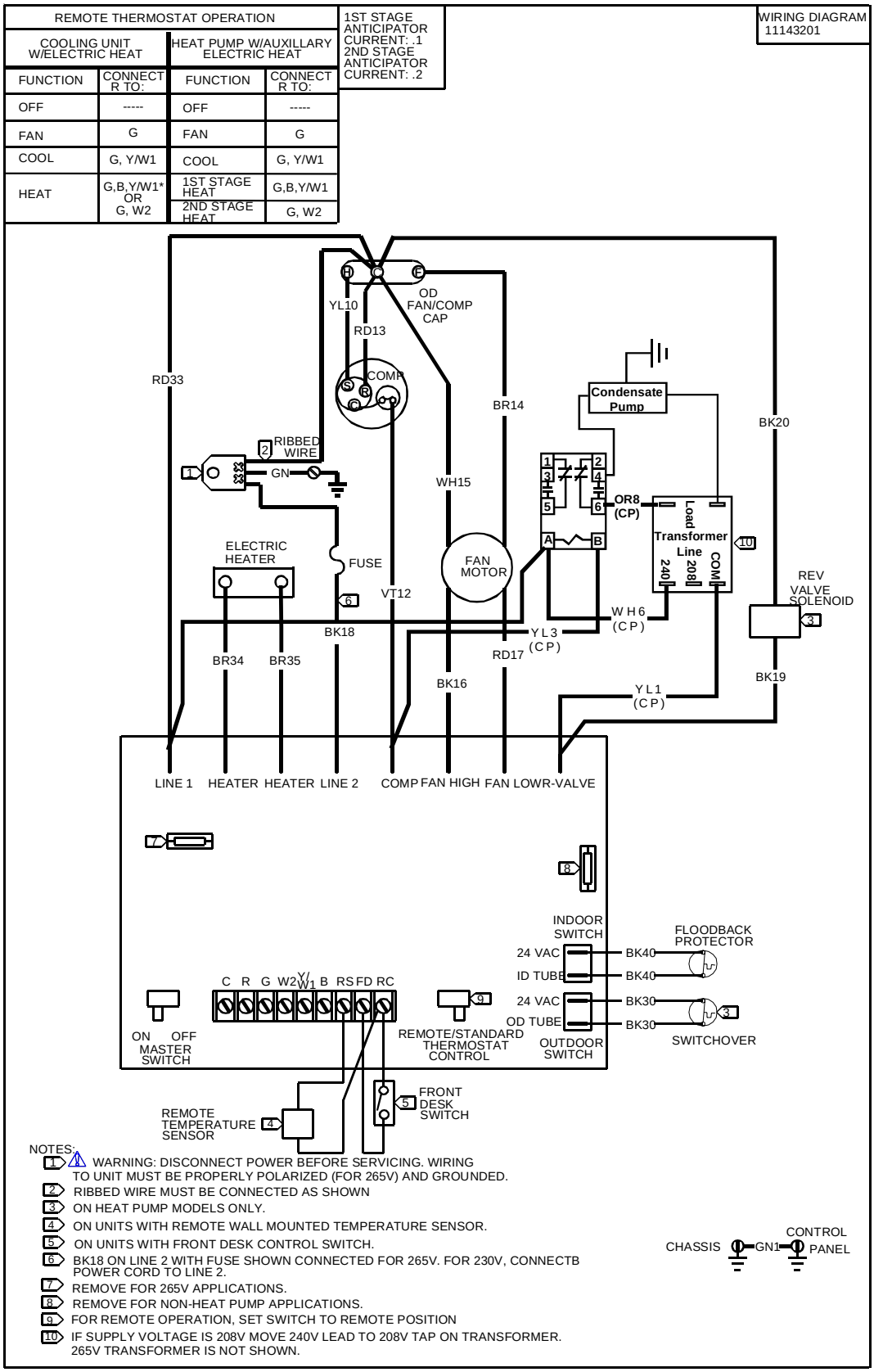

PTC and PTH
(Condensate Pump - One Stage Heat)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

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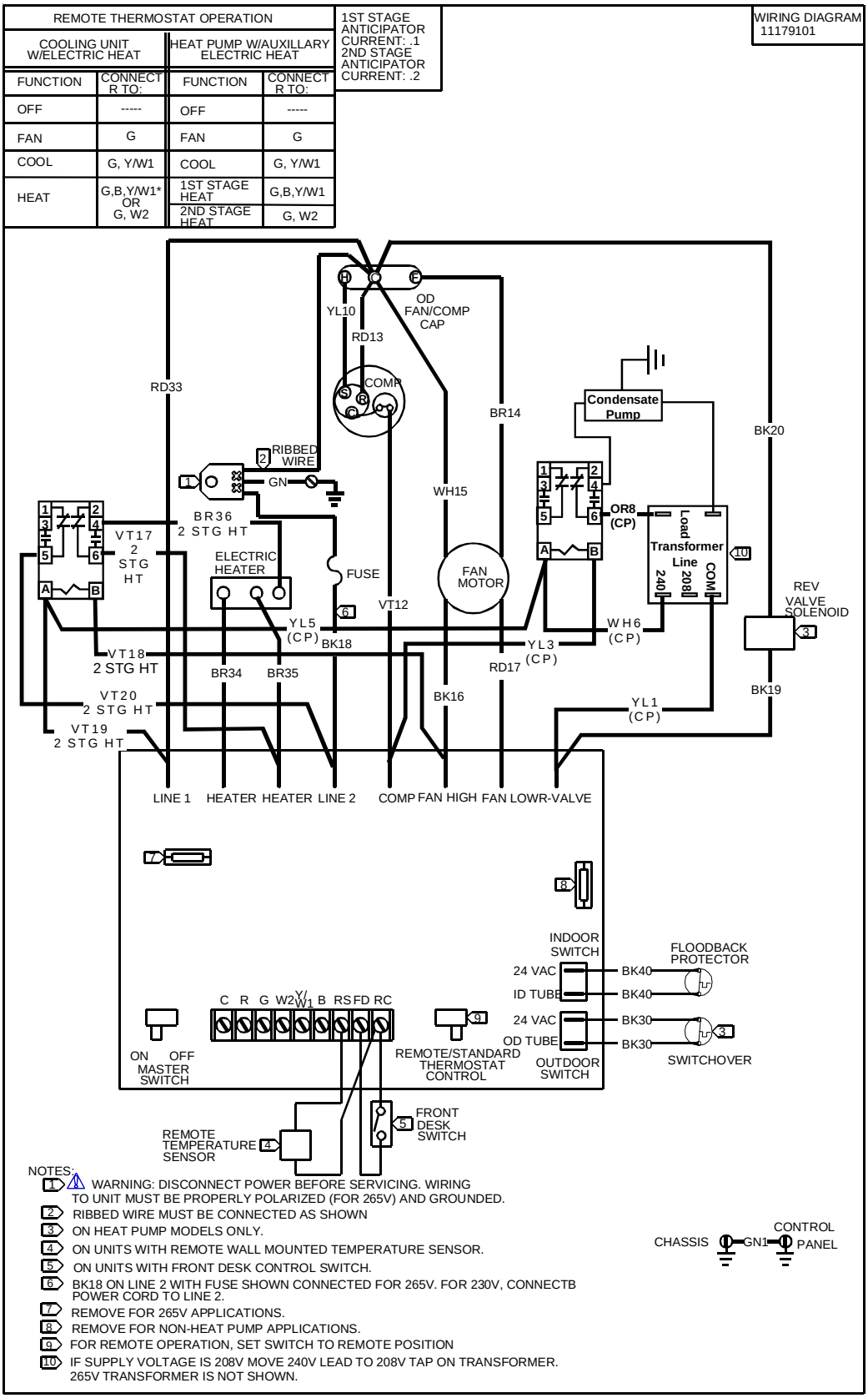

PTC and PTH
(Condensate Pump - Two Stage Heat)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

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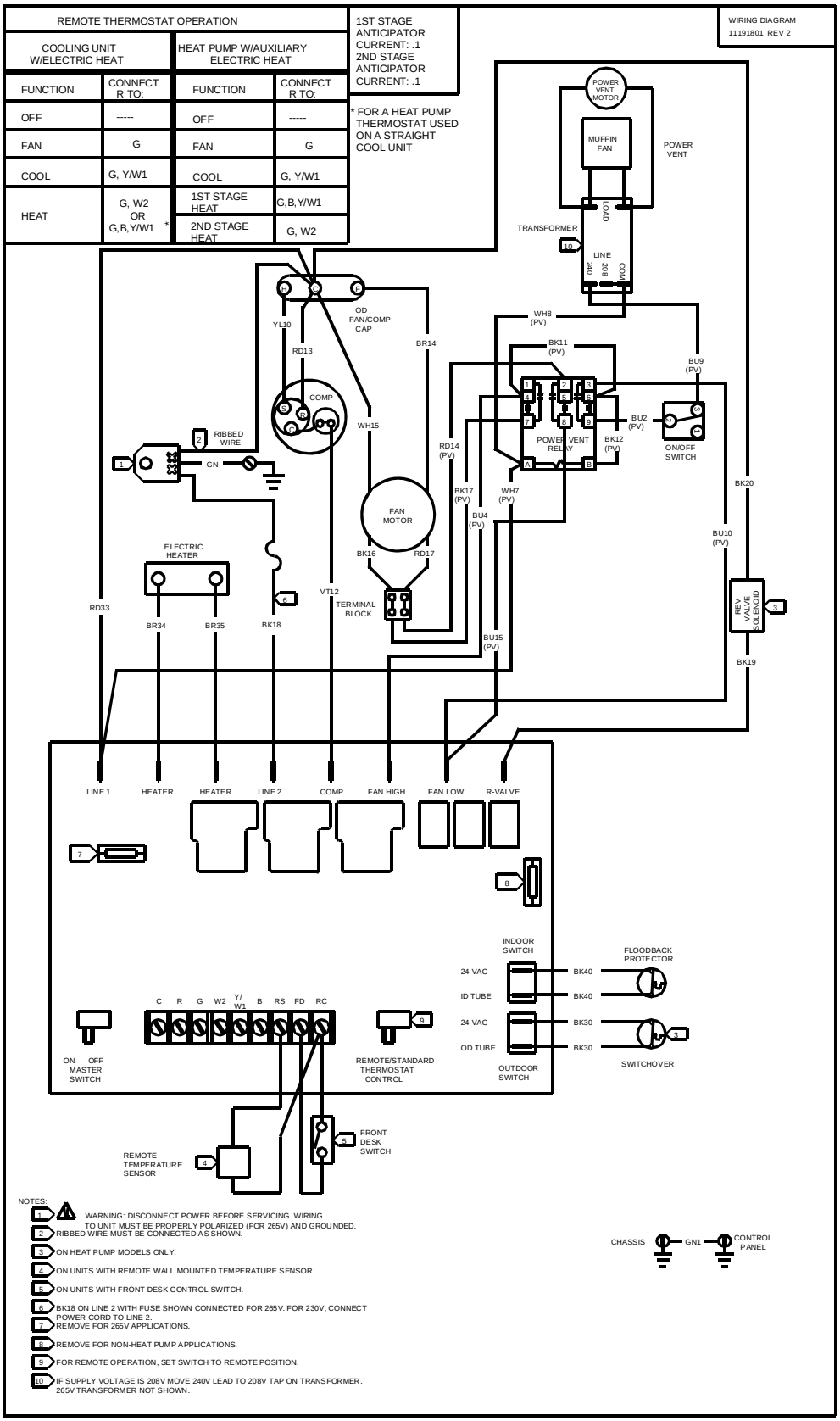

PTC and PTH
(Power Vent - One Stage Heat)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

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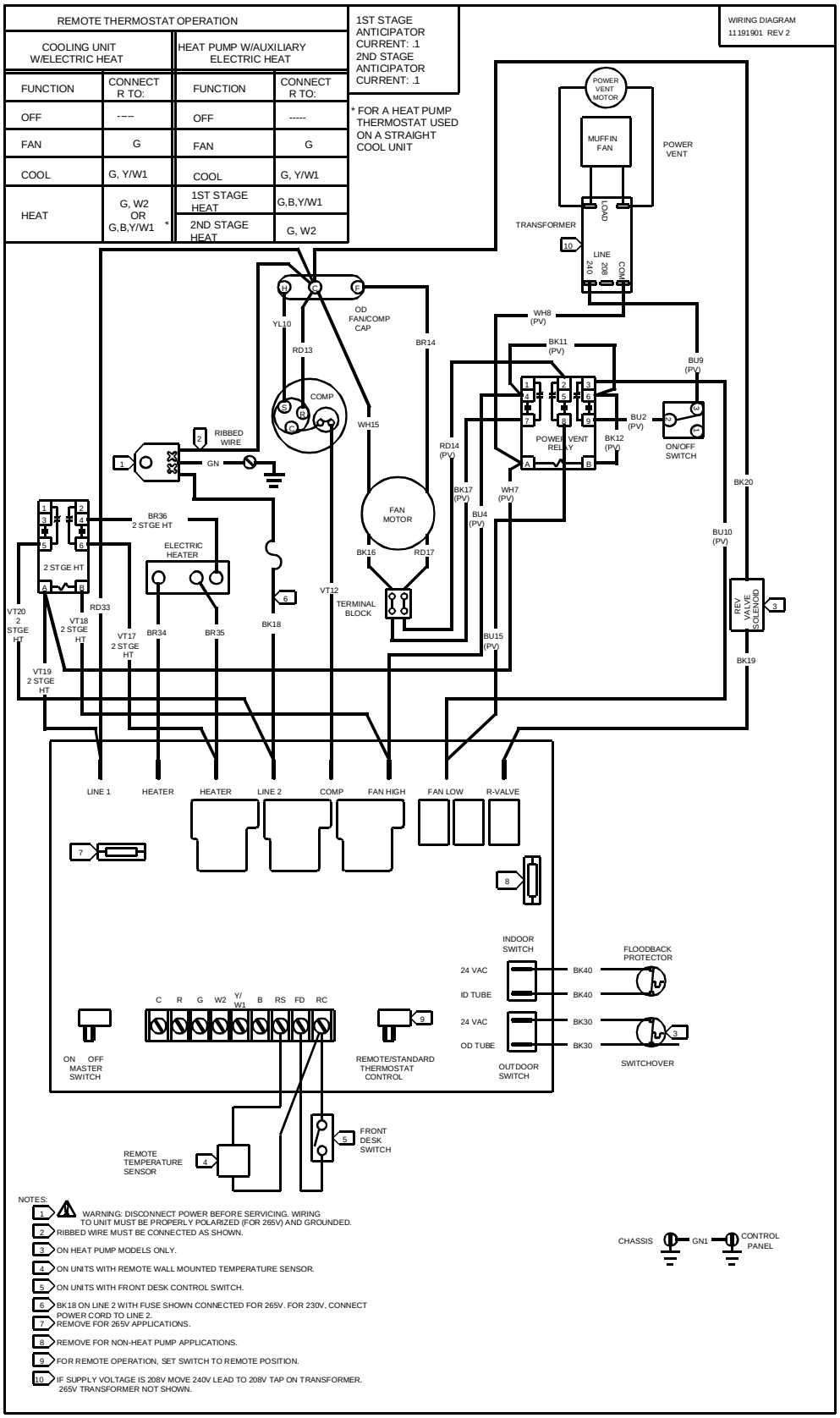

PTC and PTH
(Power Vent - Two Stage Heat)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

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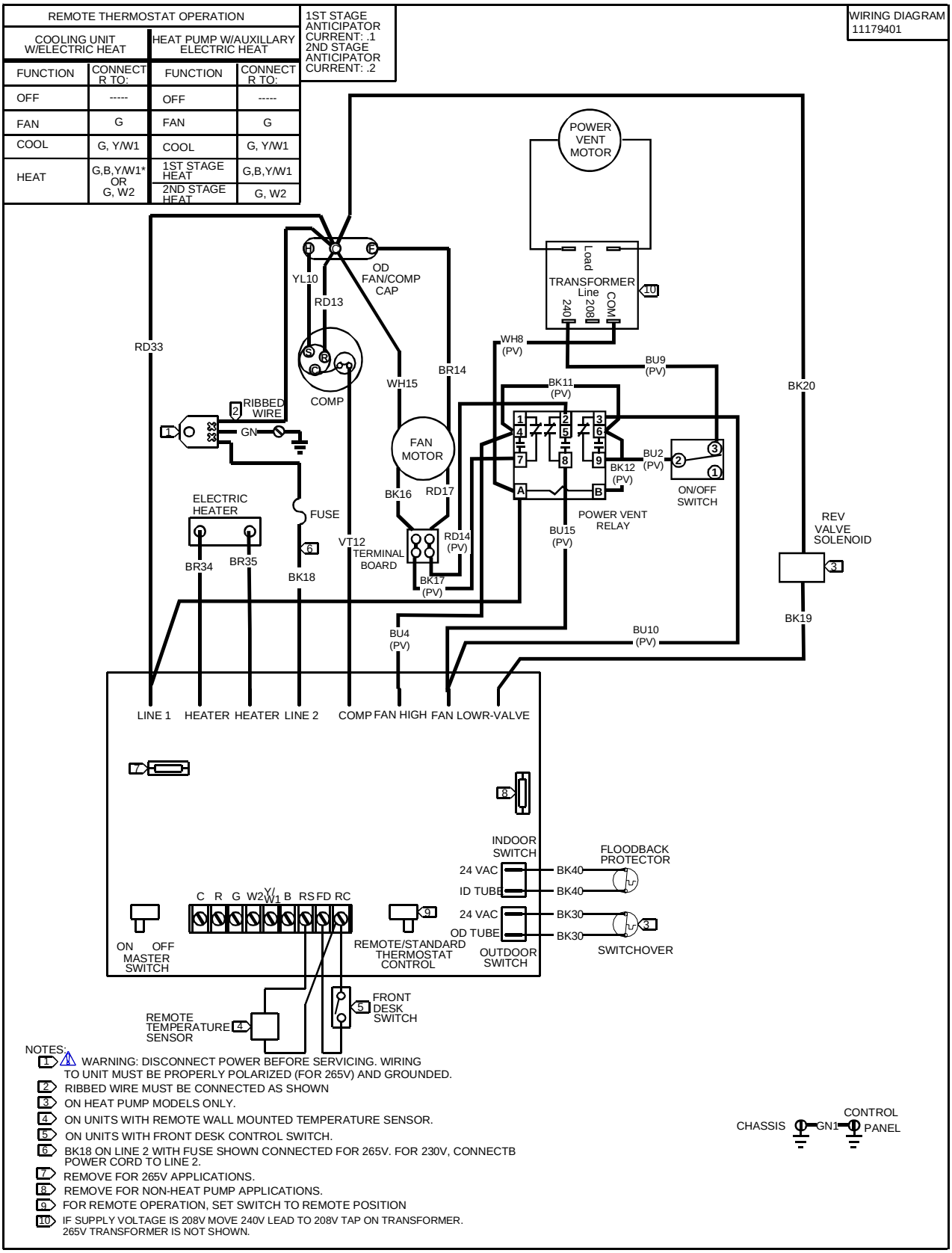

PTC and PTH
(Power Door - One Stage Heat)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

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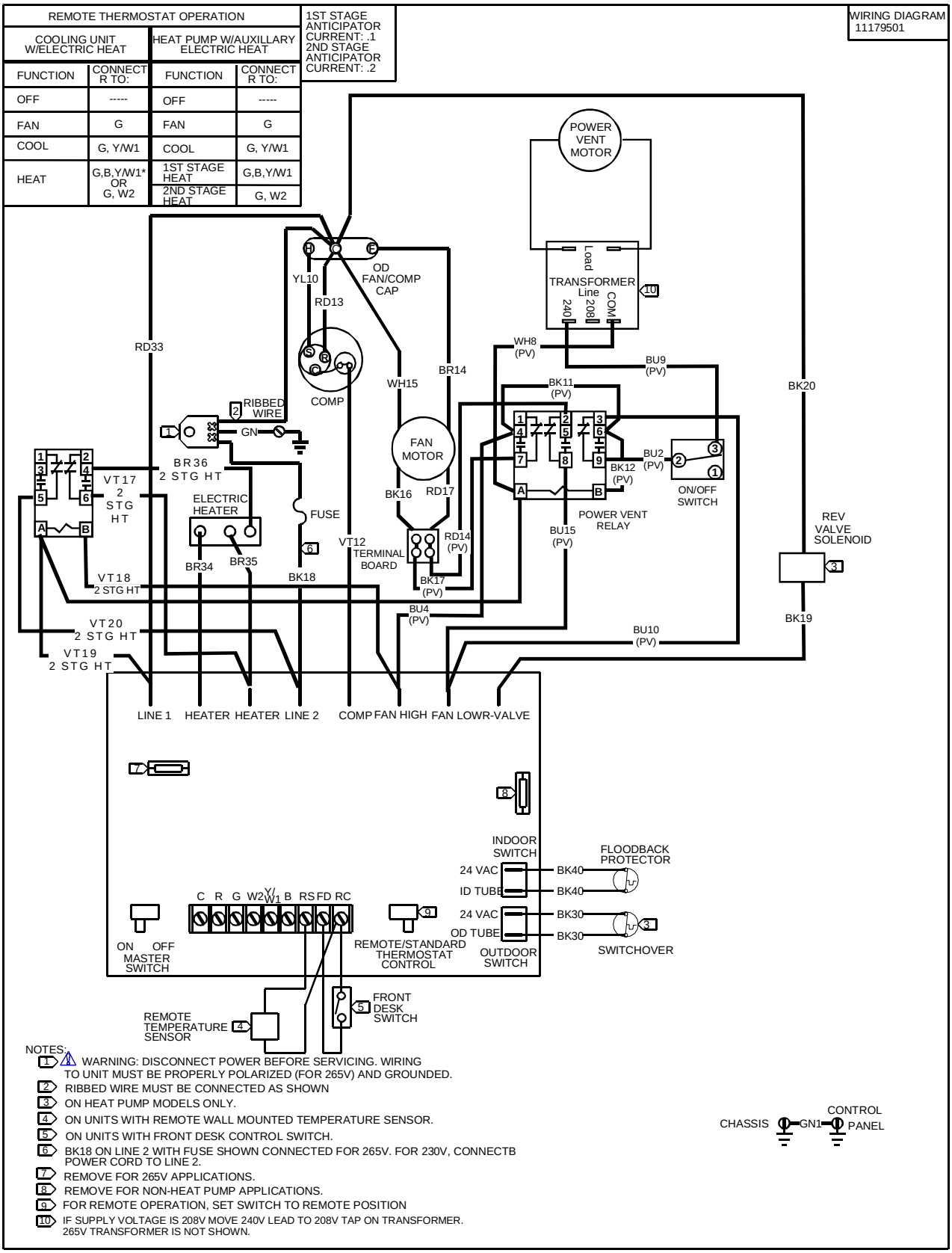

PTC and PTH
(Power Door - Two Stage Heat)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

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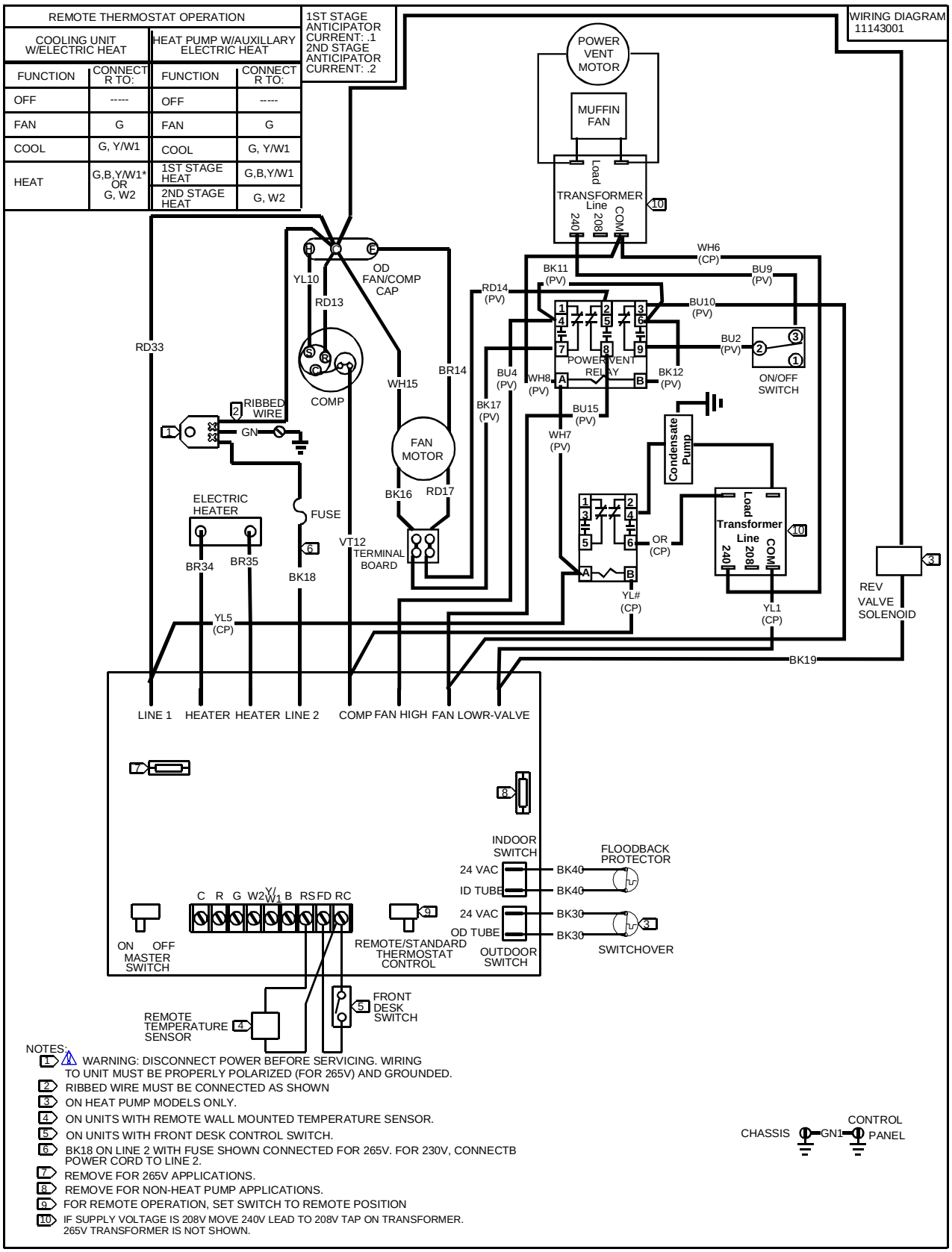

PTC and PTH
(Condensate Pump with Power Vent- One Stage Heat)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

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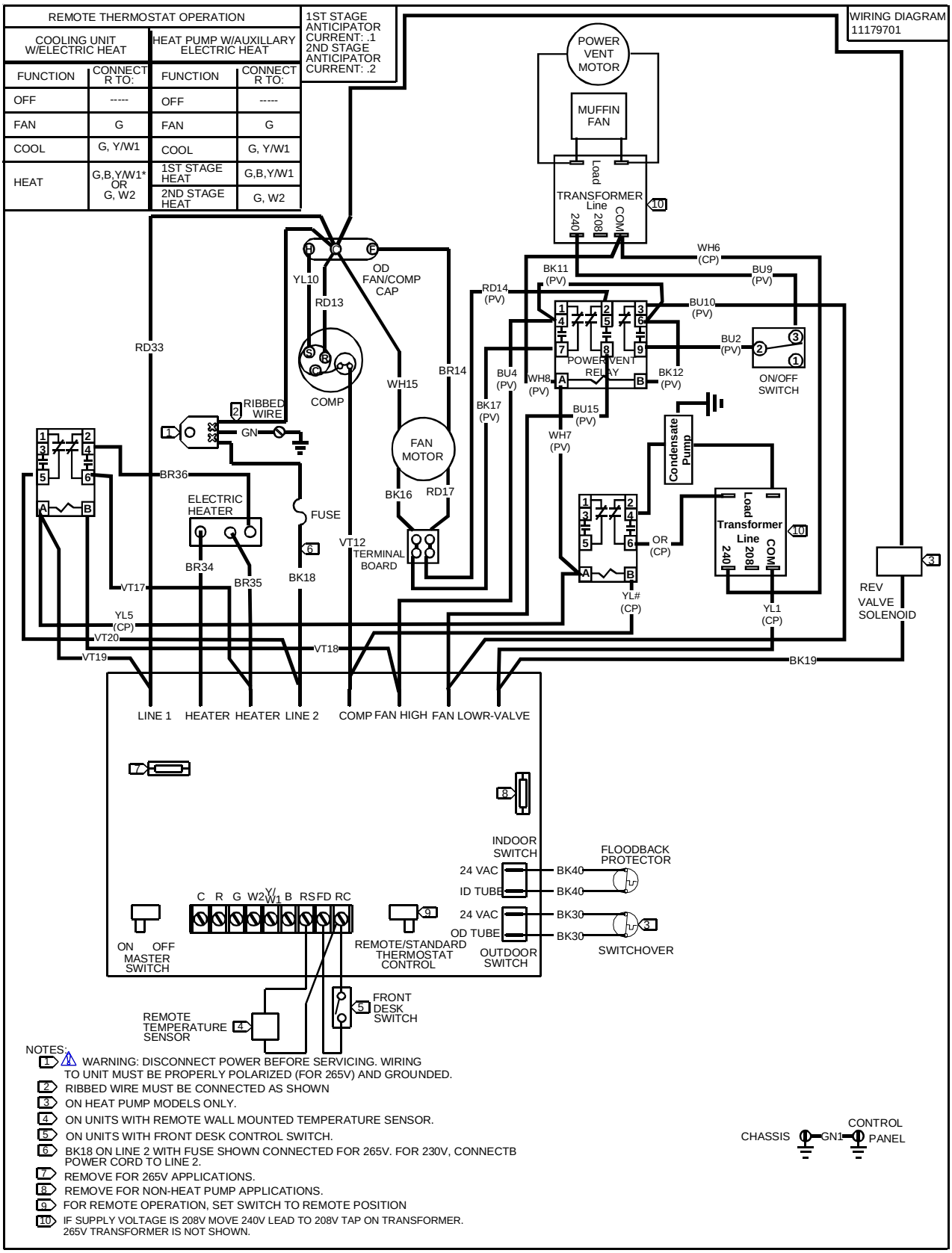

PTC and PTH
(Condensate Pump with Power Vent- Two Stage Heat)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

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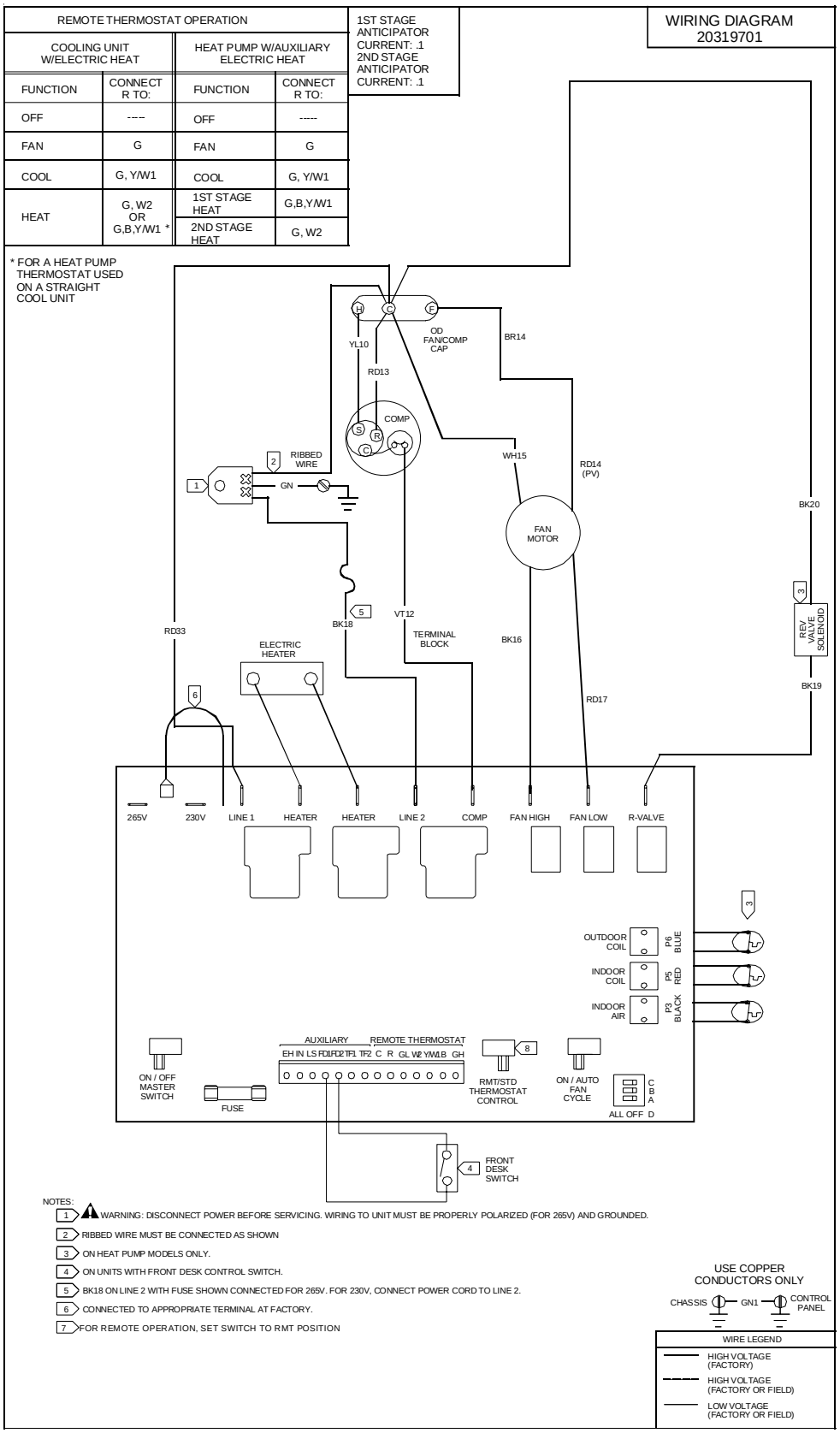
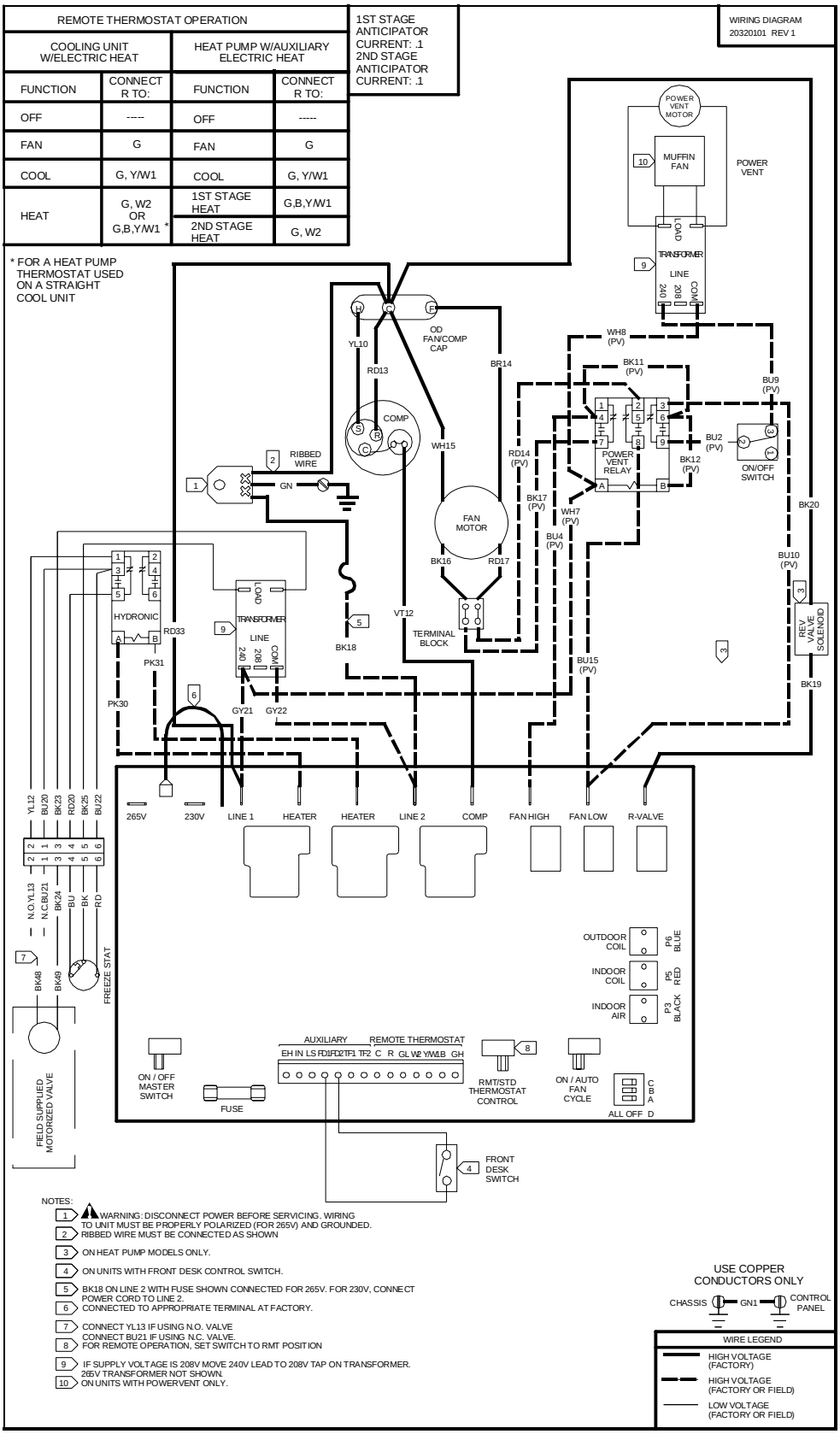


PTC and PTH - C Models

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

WARNING **TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.**



PTC and PTH - C Models
(Condensate Pump with Power Vent- Two Stage Heat)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

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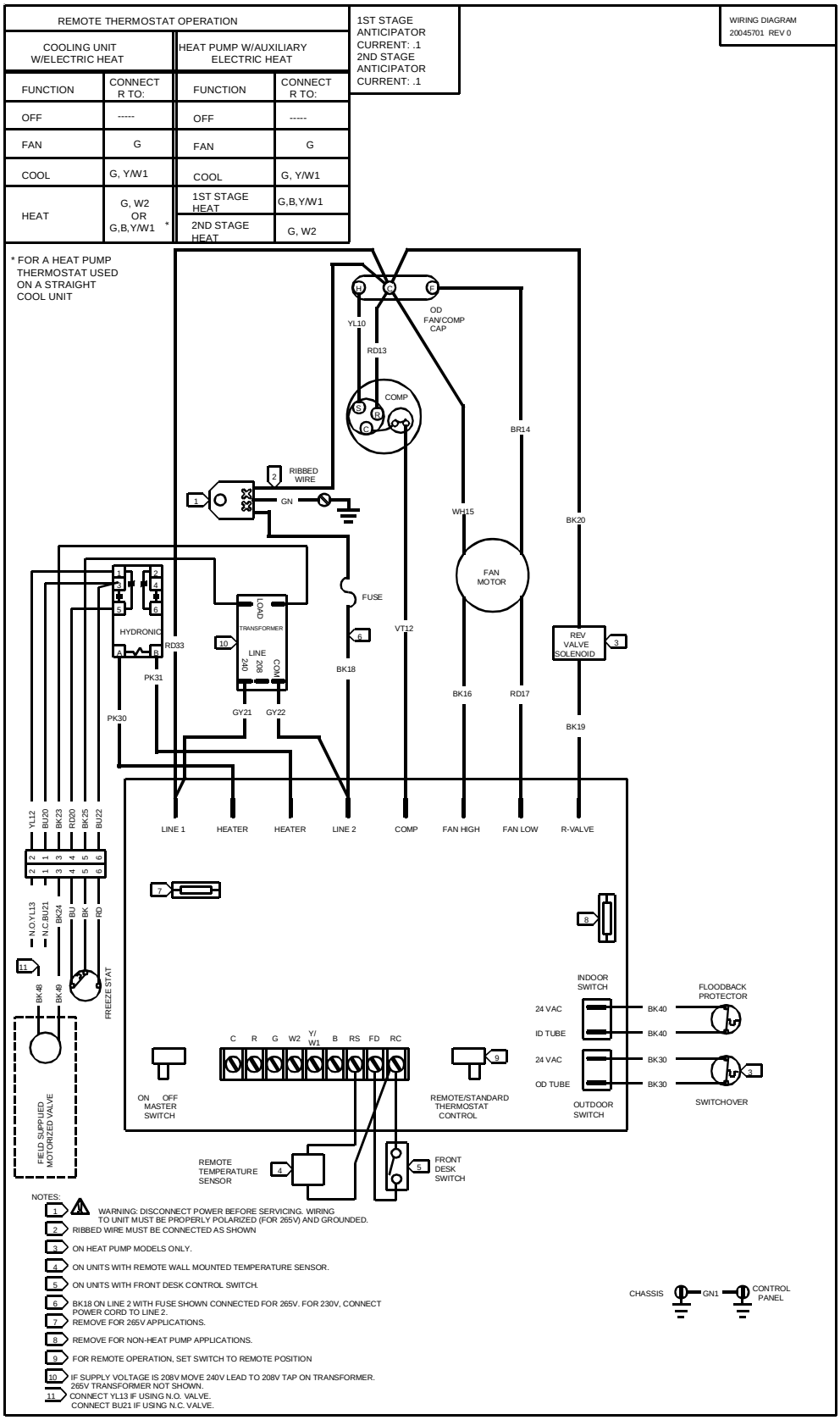
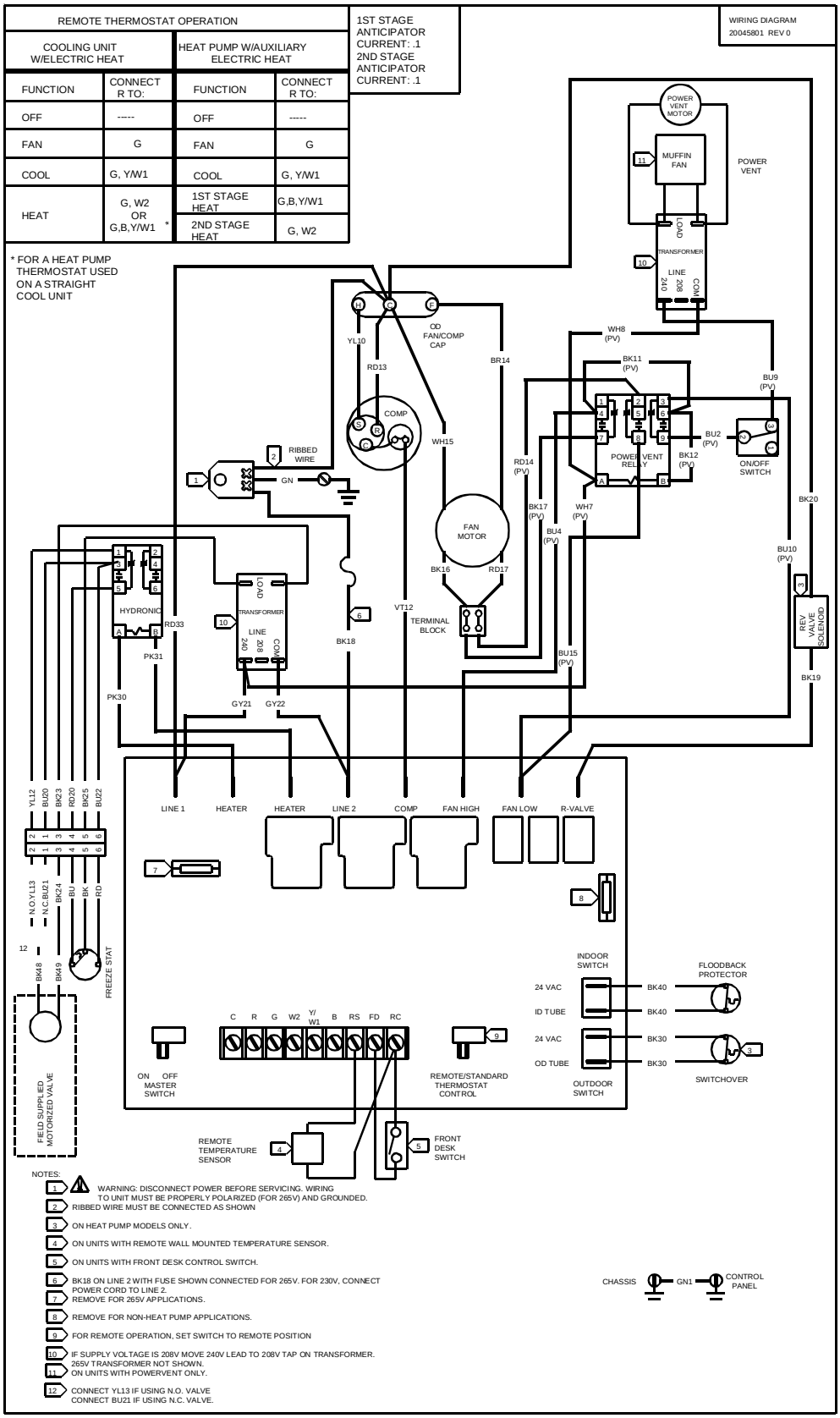


Hydronic

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

WARNING **TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.**

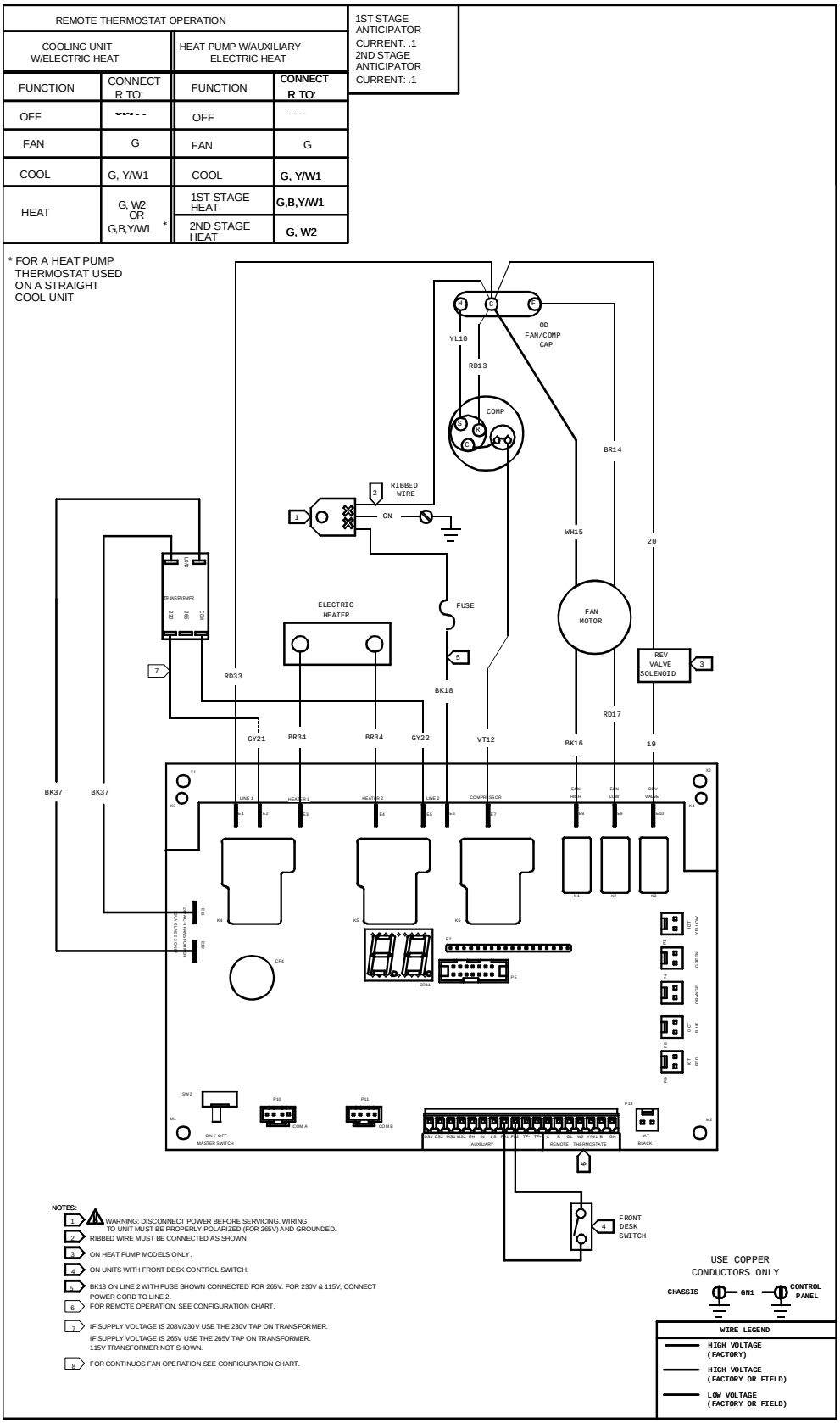


Hydronic
(Condensate Pump with Power Vent or Power Door)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

WARNING **TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.**

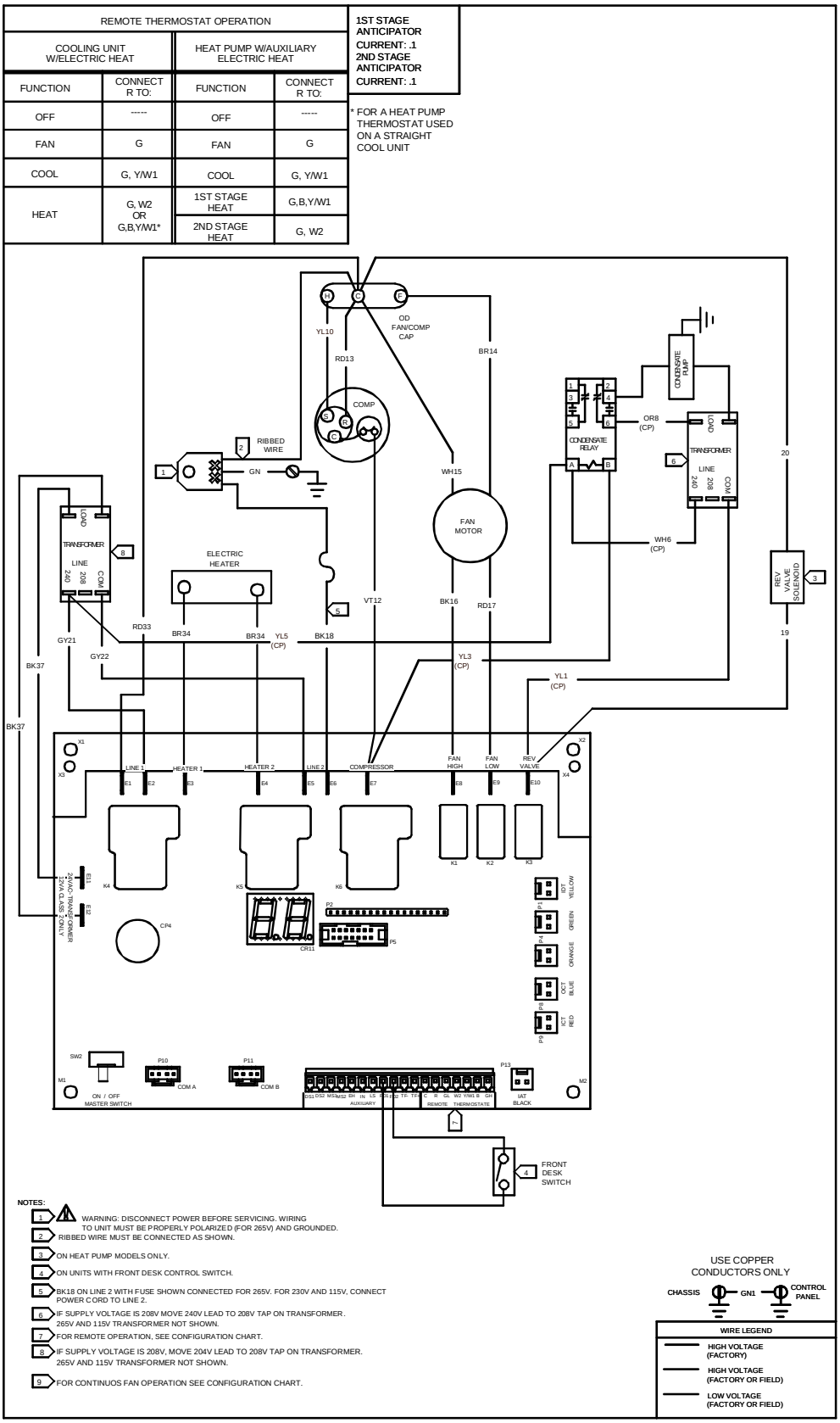


PTH and PTC-G, K Models

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

WARNING **TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.**

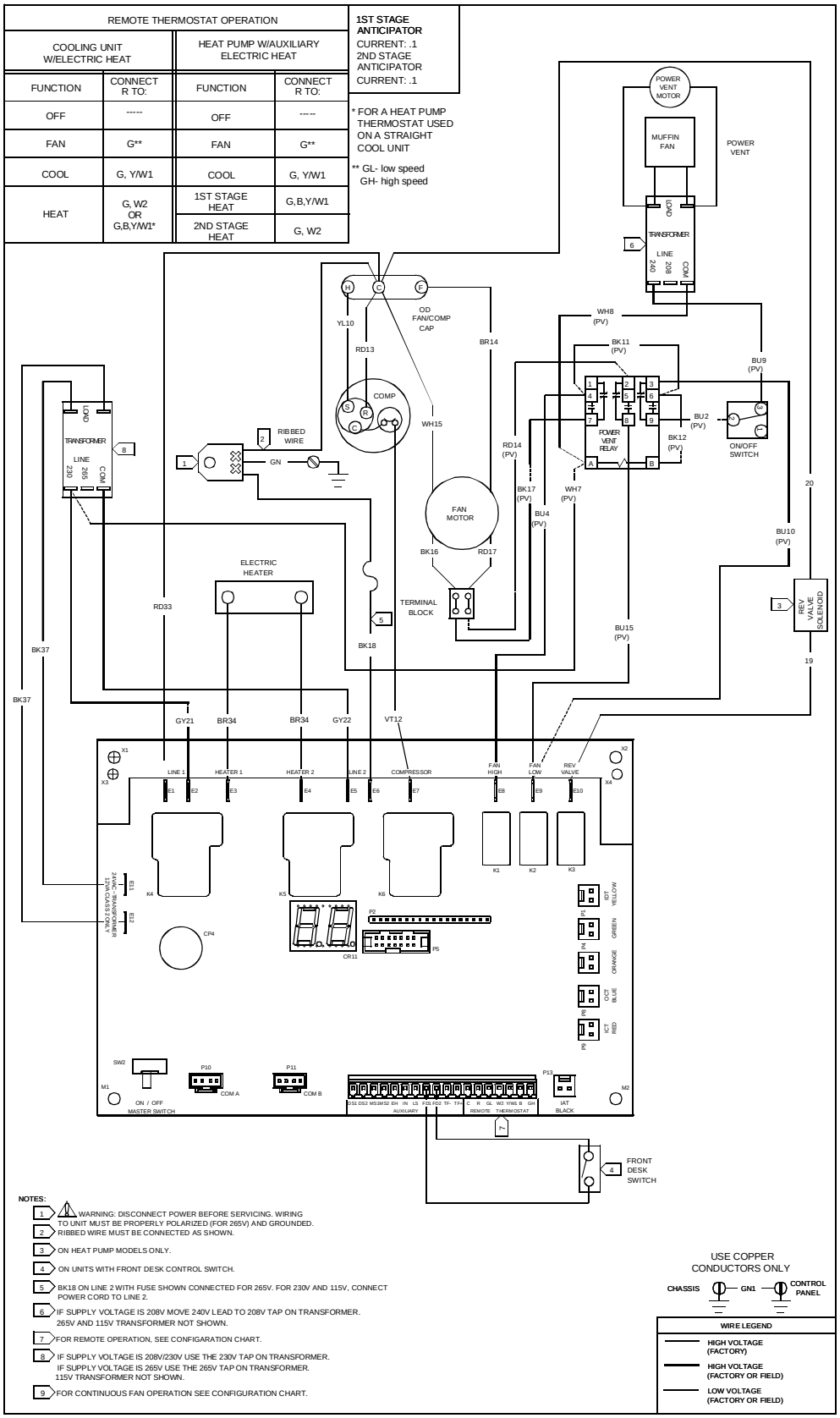


PTH and PTC-G, K Models
(Condensate Pump)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCHEMATICS

WARNING **TO AVOID POSSIBLE ELECTRICAL SHOCK, PERSONAL INJURY, OR DEATH, DISCONNECT THE POWER BEFORE SERVICING.**



PTH and PTC-G, K Models (Power Vent)

Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.